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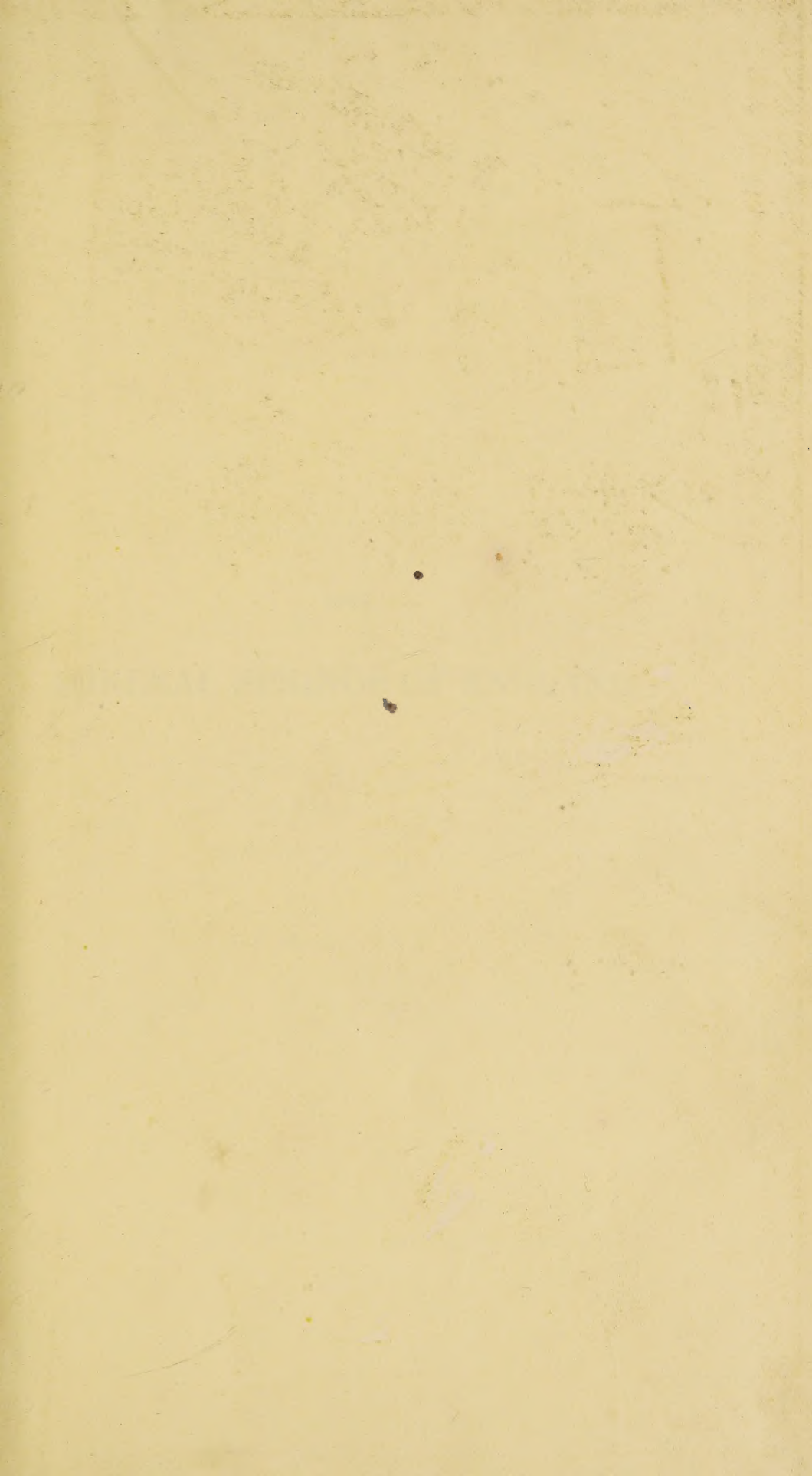
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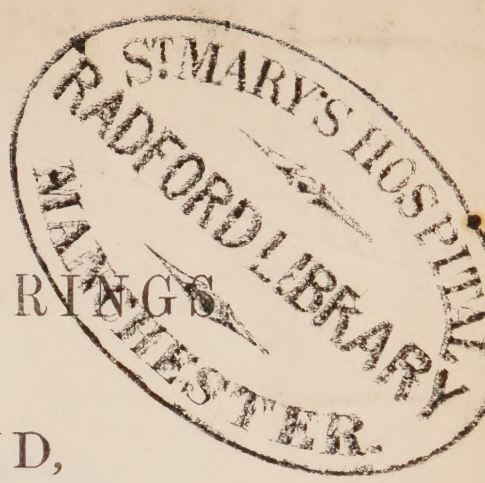
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THE

MINERAL SPRINGS OF ENGLAND.



THE
MINERAL SPRINGS
OF
ENGLAND,

AND THEIR CURATIVE EFFICACY :

WITH REMARKS ON BATHING,

AND

ON ARTIFICIAL MINERAL WATERS.

BY

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MINERAL SPRINGS OF THE CONTINENT," &c.

"The time is gone by, when the treatment by mineral waters (Brunnenkur) was looked upon as an *ultimum remedium*. At the present day, they are to be regarded in many cases as the more commodious and agreeable means by which invalids may be relieved in the most permanent manner from their troubles and annoyances."—VETTER. HEILQUELLENLEHRE.

LONDON :
WHITTAKER AND CO. AVE MARIA LANE;
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1841.



LONDON:

PRINTED BY IBOTSON AND PALMER, SAVOY STREET.

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P R E F A C E.

THE importance of mineral waters in the treatment of disease is every year becoming more evident both to professional and non-professional persons in Great Britain ; but since the public has become better acquainted with the mineral springs of the continent, and more able to appreciate the advantages of this class of remedies, no account has been given of those of England collectively ; the notices which I gave of some of them in the appendix to my work on the “ Watering Places of the Continent,” with the view of comparing them with some of the continental ones, being too brief to be of use in a practical point of view ; and further experience, during my visits, and the period of my sojourn at the principal English watering-places, having shown me that some of my former comparisons were erroneous, I considered that it would be serviceable to publish

a separate work on them, which might impart information of a local and practical nature to medical men and invalids, without entering into a lengthy account of each individual place, which may generally be found on the spot in the guide-books, and particular local treatises on the waters, to some of which I have referred. In order to render the book more generally useful, some remarks on bathing are subjoined, as also on artificial mineral waters, which are now a good deal employed in England, but of which I am not aware that any comparison of their advantages with those of the natural springs exists in the English language.

Brighton, Dec. 1840.

POSTSCRIPT.

THIS small volume was printed in December last, but its appearance was delayed till the present time on the recommendation of the publisher. Another work having since been published on the same subject, the author thinks it right to state that his notes were collected before he was aware that any such was in preparation. Having been out of England during the last two months, and not having read the “Spas of England,” he is unable to say how far that work might have supplied the desideratum in English medical literature, so as to have rendered the publication of his own unnecessary—of which, however, the public must now be the best judge; though if he might be allowed to form an opinion from a former work, “The Spas of Germany,” he would be inclined to consider that on this occasion, also, *l'un n'empecheroit pas l'autre*.

London, March 25th, 1841.

MR. LEE having heard, in former years, from various quarters, that several persons were desirous of meeting with him in England, begs to intimate his intention of leaving town in the beginning of June, and of returning to Brighton in September.

38, *Golden Square, April 1841.*



AVANT-PROPOS.

LESION of the solid parts of the body, and changes of structure, have been too exclusively considered in estimating the diseased conditions of parts, while the altered state of the fluids, and of the nervous influence from which so many, particularly chronic diseases, originate, has been, from the days of the humoral pathology until lately, too frequently overlooked, or regarded only in the light of an effect. Indeed, a late distinguished physician considered a morbid state of the blood, and of the nervous substance, as the sole cause of chronic diseases, and observed, “ Physicians are in the habit of regarding the solid parts as the primary agents of life, to which the fluids are subordinate; but, on the contrary, the blood and the nervous sub-

stance are the primitive and essential instruments of all the organic functions, while the solid parts occupy an inferior grade, and are but of secondary importance in disease. 'The elements of general and internal disease, or the morbid predispositions which form the most important objects of treatment, may then all be reduced to vitiated states (*dyscrasies*) of the blood, and of the lymph, or to derangement of the nervous system.'*

The attention of the profession, both in this country and on the continent, has, however, of late years been more particularly directed to the primary changes in the functions of the nervous system, and in the blood and secretions, to which the more advanced state of organic chemistry has materially contributed, and has tended to elucidate the pathology of several diseases. Thus, it is now ascertained that the quantity of fibrine is increased in acute inflammations, and also in phthisis; in typhus the blood is watery, and in the last stage of this disease appears scarcely to contain any fibrine. In most chronic diseases the quantity of fibrine in the blood is diminished. The blood of females is more watery than that of males,

* Kreysig. Des Eaux Minérales Naturelles et Artificielles, &c.

and that of children and old persons is also more so than in healthy adults. According to the microscopical investigations of Schultz, the globules of blood are not entirely fluid, as has been supposed, but are hollow bladders into which air is absorbed in the process of respiration. By the continued use of alkalis the blood is rendered more fluid, the coagulation of its fibrine is prevented, and its colour becomes brighter; on the other hand, the use of nitric acid produces an inflammatory coat: after the exhibition of certain narcotic substances, the blood becomes more fluid and darker coloured. The quantity of iron is in direct proportion to that of its red globules; by the abstraction of blood, the iron is diminished, and by the exhibition of the preparations of this metal, the fibrine is increased, and the blood assumes a brighter red colour. According to Dr. Carswell, tubercles are never formed when the blood is not in a diseased state. Crystals of the salts eliminated in gout have been found by Jahn in the blood of gouty patients.*

The experiments of MM. Prevost, Dumas, and Muller, have thrown considerable light upon the action of particular substances on the

* Schmidt's *Jahrbücher der Medicin*.

blood. Thus, it was observed in a frog, that when a drop of water comes into contact with a drop of blood, the globule, which has naturally an elliptical flattened shape, becomes round, and its course is accelerated. When, however, the experiment is made with a saline solution, as common salt, or subcarbonate of potass, in water, no alteration of form occurs. The dimension of the globule is altered by contact with particular substances; thus, liquor potassæ, though it does not alter the form of the globules, renders them smaller;—a minute quantity of pure soda added to the blood abstracted from a vein prevents its coagulation. Acids produce increased oxidisation, coagulation, and redness of the blood, whereas the action of alkalis is more solvent, rendering the blood thinner and more liable to decomposition. It has been also demonstrated by experiments on rabbits, that iron is absorbed into the blood only in a limited proportion, the remainder of the quantity given being excreted.*

Alterations in the quantity and chemical composition of the different secretions, it is well known, may depend upon the influence of the nervous system, and of an altered condition of

* Schwartz, Allgemeine Heilquellenlehre. Leipsic, 1839.

the blood, either occurring from morbid causes, or from the introduction of particular substances into the circulation—of which the flow of tears from mental emotion, the change in the urine of hysterical patients, increased alkalinity of this secretion from injury or disease of the nervous centres, the calcareous concretion deposited in the joints of gouty persons, may be mentioned as familiar examples; but the agency of the organic nerves in producing these changes, both in the blood and secretions, and in inducing various diseased states, is not in general sufficiently considered. Scirrhus tumours, for example, are not unfrequently caused by depressing emotions, as grief, anxiety, &c., acting primarily upon the cerebro-spinal system, and consecutively upon the capillary vessels of the part; so, in like manner, indurations of viscera, and other local functional and structural changes of organs, may be induced by derangement of the functions, or by direct lesion of the sympathetic or organic nerves, which, united by numerous inosculations with those of the cerebro-spinal system, extend their influence to all parts of the body, and which have been proved, by the experiments of M. Brachet, to preside over the action of the capillary vessels, and of

the functions of nutrition and secretion. An anormal condition of the organic nervous system, or part of it, frequently depends upon alteration of the quantity or the quality of the blood by which it is nourished; and when this is the case, it does not fail to react upon and increase the disordered condition of the vascular system. When, several years ago, it was observed that a section or mechanical lesion of the branch of the fifth pair of nerves supplying the eye produced increased vascularity, with subsequent sloughing of the cornea, acute inflammation was supposed to have been produced by the experiment, and to have given rise to this result. A similar effect, however, was subsequently found to ensue in animals which were fed upon sugar or other substances in too concentrated a state to afford them proper nourishment; and M. Brachet clearly demonstrated that the circumstance did not depend upon inflammation, but simply upon mechanical distension and consequent obstruction of the circulation through the capillary vessels, from their privation of nervous energy. He observes, "Let us remember that the ganglionic nervous system presides over the secretions and capillary circulation. When, therefore, in consequence of

lesion of the ganglionic nerves of an organ, its secretory and capillary action are paralysed, it does not cease on that account to receive blood, as this fluid is forced into the vessels by the contraction of the heart; but no longer finding in the capillaries the energy necessary for their reaction, it gradually distends them, and remains almost in a state of stagnation, puffs up (*boursouffle*) the parts where the textures are sufficiently lax to admit of it, and determines redness and swelling as in the conjunctiva.”*

Hence we may see that various states which have been considered as inflammatory, are not so, but depend upon impaired nervous energy, and why depleting measures would be prejudicial, while those calculated to give tone to the nervous system would be most successful; why the spleen should be so frequently congested after attacks of intermittents, while the more dense texture of the liver is comparatively seldom affected, and why quinine tends to reduce the splenic enlargement; why the congested state of the vessels of the eye in that state which is termed strumous ophthalmia should continue so long without producing serious injury; and why, though the local abstraction

* Du Système Nerveux Ganglionaire.

diminution or the abstraction of the influence of the ganglionic system could so frequently occasion the phenomena observed in the preceding experiment, may we not reasonably infer that the same thing will take place whenever this influence is modified by any pathological affection of the upper part of the ganglionic system?"

It would be out of place, in a small work like the present, which is intended as much for general as for professional readers, to enter more fully into the consideration of the subject, enough having been advanced to indicate that in chronic diseases our attention should not be too exclusively restricted to the more prominent symptoms, but that these should be traced to their origin, which will generally be found to depend upon an anormal condition of the blood or of the nervous influence, to remedy which our means of treatment should be chiefly directed; and of these means none are more efficient than the internal and external use of mineral waters, which, by their penetrating influence, and the facility with which they are absorbed, tend most effectually to the end proposed. I shall therefore conclude with the words of an author I have already quoted—

“ There is not the least doubt that medicinal substances, and among them mineral waters, are absorbed into the blood, and cause various alterations, which may occur directly or indirectly, in the following manner :—

“ 1st. The substances contained in mineral waters may combine in various ways, according to the laws of affinity with those in the blood, and occasion separations, neutralisations, and decompositions, as, for example, when there is increased acidity or alkalinity. By the use of an alkali, or an alkaline mineral water, the disposition to urinary acidity is removed, and the previously acid urine assumes an alkaline character.

“ 2nd. By their means a more complete nutrition and vivification of the organisation is occasioned, as is seen in the restoration of suppressed or irregular menstruation : in chlorosis, in which there exists atony of the solid parts, and a deficiency of colouring matter in the blood.

“ 3rd. By their means increased activity is occasioned in the functions of the secreting organs, and morbid matters are expelled from the blood.

“4th. By these agents the morbidly oppressed or excited vital functions are brought back to a normal condition, and the deranged equilibrium of the powers is restored.”*

* Schwartze, Op. Cit.

INTRODUCTORY REMARKS.

NOTWITHSTANDING the numerous works on mineral waters which have from time to time appeared, in the English language, little has been done of late years towards the further elucidation of the mode of action of this class of remedies, which has not received that degree of attention in England which its importance requires, and which it has obtained in other countries. In France, most of the mineral springs are under the superintendence of government, which appoints medical inspectors, who regulate the matters connected with the various establishments, without whose authority the use of the baths is prohibited, and by whom a vast body of information relating to the effects of the waters is thus annually collected, is dis-

cussed in the various medical societies, and made public by means of the periodicals. At several of these establishments, as well as at the principal German baths, the waters are rendered more generally available to the poorer classes of the community by the erection of hospitals, to which patients are often sent from large cities, or from a distant part of the country. Similar institutions exist on a smaller scale at two or three places in England; but the number of patients is necessarily very limited. The use of mineral waters may, therefore, be considered as almost entirely restricted in England to the upper and middle classes of society; but the manner in which they are too frequently employed appears to me but little calculated for obtaining the full effect of their beneficial action, and is very different from that recommended by the physicians at the continental springs, who, trusting exclusively to the waters, advise their patients—except in some particular cases,—to abstain from the simultaneous employment of other remedies, which must interfere with, if not altogether counteract, their operation. Whereas in England, the invalids who resort to a watering-place, are frequently either treated altogether by pharmaceutic remedies, or, if they

use the waters, substances more or less active are too frequently superadded, by which their action is overpowered, and instead of the gradual operation which should characterize the proper use of a mineral spring, and which is best calculated for the permanent removal of chronic diseases, particular organs are overstimulated, producing a manifest increase of their secretions, which, being frequently followed by a temporary amelioration, tends to mislead both the practitioner and patient, and induces them, on a recurrence of unpleasant symptoms, to have recourse to the same or to more energetic measures, by which the disorder is seldom cured, but is more often aggravated, and not unfrequently terminates in the supervention of irremediable organic disease. Great Britain, however, possesses but few thermal springs in comparison with their number in France and Germany, in which countries bathing forms so essential a part of the treatment by mineral waters; nor do the British springs, with two or three exceptions, possess anything approaching to the amount of fixed and gaseous mineralizing constituent parts, which (when the internal administration is considered) in several of the continental ones are so efficient in the removal

of long-standing disease; and thus the alterative effects of these remedies are less known and sought for in England, than their sensible and immediate action upon particular organs.

That a sensibly increased action of some of the most powerful mineral waters upon the alimentary canal, at the time of their employment, is not essential in many cases to their efficient operation, is proved by the circumstance which Drs. Kreysig, De Carro, and others, have had frequent occasion of observing in the Carlsbad waters, (which generally do produce some action upon the bowels at the time,) that indurations, obstructions, &c., may be cured by their use, not only when no active effects result from drinking the water, but even though constipation be induced by it, and the beneficial effects are produced entirely by its alterative and solvent operations.

In a large proportion of patients under a course of these waters, the bowels are at first rather confined than otherwise, till the system becomes in some measure saturated, and a reaction takes place, evidenced by copious evacuations of a critical nature, which occur without causing debility, sometimes during the course, at others after the water has been discontinued for some days or weeks; and it is considered prejudicial

by the local practitioners to have recourse to purgative medicines, (unless when the constipation produces unpleasant symptoms,) by which the absorption of the water, and its general and alterative effects, would be prevented. These after-effects, or critical evacuations by the bowels, the kidneys, or the skin, which so frequently occur from the use of foreign mineral waters, are seldom or never experienced by persons after the use of English ones, partly from their mode of administration being more calculated to produce a local instead of the general operation, which is most effectual in the removal of many long-standing diseases, and partly from the greater richness of the continental springs in saline and gaseous constituents, combined, in some instances, with a high degree of temperature, by which their action is rendered more penetrating and efficient; though it does not follow that the English springs are to be considered comparatively inefficacious, as the more slightly mineralised springs are often extremely active, and are better adapted to some constitutions and cases than stronger ones. Thus the waters of Wisbaden might not suit several persons with whom those of Bath might agree; and the springs of Cheltenham or Leamington

might be recommended with advantage to some invalids who would be unable to bear the more gaseous and exciting ones of Kissingen or Marianbad.

The extent to which the employment of active medicines in chronic disease has been carried in the British dominions, is made a subject of just reproach by foreign to British practitioners, and nowhere is this practice more followed than at the various watering-places, which is sufficiently evident by the numbers of medical men and druggists who are congregated in those places. The public, however, is in great measure to blame for this practice, by encouraging the custom of remunerating the great body of practitioners, not according to the attendance, but in proportion to the quantity of medicine sent. To this custom may also be ascribed the habit which the English have acquired of dosing themselves and their families with active drugs, on every slight deviation from a state of health. It is gratifying, however, to observe, that of late considerable alteration has been effected, both as regards the doses of medicines in chronic disease, and the mode of remunerating professional services; though it is to be feared that, from prejudice and other causes, it

will be long before the generality of the public and medical men will become aware that their true interest consists in the abolition of the present system.

The manner in which mercury was used, or rather abused, some years ago, has been the occasion of the production and countenance of a host of nervous, dyspeptic, hypochondriacal, and other complaints, which were frequently relieved for a time by the medicine, (in the same manner that the drachm or dose of opium excites for a period those accustomed to their use;) and this often tended to keep the practitioner and patient ignorant of a principal cause of the intractableness of the complaint, either till recovery took place, in some instances from the medicine being discontinued, or from some accidental circumstance, as change of air, scene, &c., or till, in other cases, the general health was seriously impaired, and not unfrequently a foundation was laid for the supervention of organic disease of important viscera.

The small and daily repeated doses of this agent, which it is the practice of some persons to recommend in the majority of dyspeptic cases, and which have been considered to be comparatively harmless, are perhaps more per-

nicious from the gradual accumulation of mercury in the system, than when larger doses are given at longer intervals, as these would be carried off by the increased alvine secretion which they would produce. Let me not be misunderstood, in the preceding remarks, as wishing to depreciate the proper employment of medicines, and of one of the most efficient agents we possess for the treatment of many diseases, both medical and surgical, in which large quantities of mercury are often exhibited with the greatest advantage; it is against the indiscriminate use of powerful medicines by some practitioners, and by non-professional persons, especially in cases of stomach and bowel derangement depending upon chronic irritation of the mucous membrane or morbid susceptibility of their nerves, and in nervous affections occurring in the young and delicate, that I am induced thus strongly to protest. In certain cases of disordered digestive organs, mercury, judiciously administered, is a highly useful, and sometimes an indispensable remedy, and its employment may even on some occasions be advantageously superadded to the use of mineral waters.

Many chronic complaints, especially when not of long standing, would be better treated by

medicines than by mineral waters, which I by no means wish to be considered as a method of universal application, and which, in some instances, would be altogether inapplicable; but, on the other hand, there are many diseases, of long duration, in which medicine has been of but little avail, (it may be on account of the patient's habits, mode of life, &c.) and which a properly directed course of mineral waters would often remove when no other means would succeed; this resource is, however, frequently delayed till the last, the patient having gone through the whole range of pharmaceutical preparations, by which the chances of advantage from mineral waters is much diminished. This, though more frequently the case with English invalids, yet often occurs with those of other countries, and is a not unfrequent source of disappointment both to the practitioner and patient. In some instances, patients also derive as much advantage from the change of air, scene, and cessation of active pharmaceutical treatment, as from the springs themselves, as has been justly observed by a foreign author— "*Les malades qui viennent aux sources minérales ont le plus souvent épuisé toutes les ressources de la pharmacie; leur estomac est fatigué des drogues dont on*

l'a accablé, et leur suspension n'est peut-être pas un des moindres avantages que les malades retirent de leurs visites aux fontaines minérales."*

The mode of life at English watering-places differs materially from that of the continental ones, with respect to bathing being much less employed, the hours of rising and of meals being much later, the more stimulating nature of the dinners and wines ; and these last-mentioned circumstances especially have great influence in preventing many English invalids from deriving as much advantage as they might do from the waters, in many instances causing them to disagree, and requiring the frequent employment of aperient medicines. This is one reason why so many invalids, after having tried one or more of the English springs without effect, find so much advantage from a visit to one of those of France or Germany, the mode of living in these countries being better calculated to promote the action of the waters. Indeed some persons who are sceptical as to the powers of mineral waters, attribute the chief advantage to these accessory circumstances. As, however, I have already entered on the consideration of this part of the subject in my former work, I need not

* Patissier, Manuel des Eaux Minérales.

here recapitulate the proofs of the incorrectness of this opinion, but will extract a passage from the author I have before quoted, with reference to the action of mineral waters, independently of these circumstances.

“The evidence of antiquity with regard to the efficacy of mineral waters, the experience of centuries which confirms this efficacy, the universal favour in which they are held among all civilised people, notwithstanding the difference of medical theories, sufficiently demonstrate that they are, of all remedies, those of which the reputation is the most justly established. Nature bestows these remedies liberally upon us, in order to invite us to have recourse to them more frequently in our diseases. She has consulted as much as possible our delicacy, our taste; she has tempered the virtues of the waters, their energy, and has adapted them to different temperaments. We obtain from plants and minerals many medicaments, but they almost all require certain pharmaceutical preparations; whereas mineral waters are remedies which are always at our disposal: they contain sulphur, carbonic acid, and neutral salts, which are frequently employed in the practice of medicine. Why, when found in nature’s laboratory, should

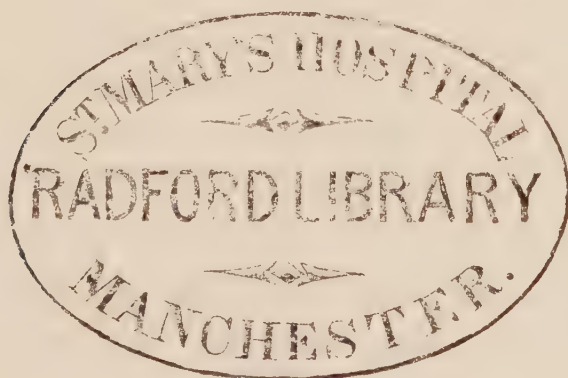
these substances not have an equal power, as when taken from that of the apothecary? Most mineral waters are not harmless; one cannot use them with impunity in cases where they are counter-indicated, and every year persons become the victims of their imprudence. So far from being inert, mineral waters are at times so active that we are obliged to moderate their energy, by mixing them with milk or some other emollient fluid.”*

. I will conclude these introductory remarks by a quotation from an English author, to whose elaborate work I beg to refer those desirous of detailed information respecting the history, geognosy, &c. of mineral springs. “In judging of the effects of a mineral water, it is important to discriminate what portion of these are to be ascribed to the mere water itself, what to its elevated temperature in the case of thermal waters, and what to its foreign ingredients. The simple circumstance of dilution will certainly facilitate the operation of matters which might otherwise pass, little changed, through the alimentary canal; and from the extremely minute state of division in which the active particles

* Patissier et Bourtron-Charlard. *Manuel des Eaux Minérales.*

are presented to the sentient mouths of the capillary absorbents, it is more than probable that they are directly absorbed into the circulating mass. Indeed, in no other way can we explain the powerful effects which result from the use of many chalybeate springs. The strongest does not contain more than five grains of the carbonate of iron to the gallon of water; the real quantity of this tonic received at a single dose into the stomach, or contained in a pint of water, must therefore be extremely small, and nevertheless it will exert a more salutary influence upon the system than twenty times the dose of the artificial carbonate in our ordinary prescriptions.”*

* On the Natural History, Origin, &c. of Mineral and Thermal Springs, by M. Gairdner, M.D. Edinburgh, 1832.



THERMAL SPRINGS.

BATH

Is one of the finest cities in England, with a population of about 50,000 persons, and lies for the most part in a beautiful valley open towards the west, and sheltered from the north and east by hills, the acclivities of which, as the town increased in size, gradually became covered with handsome streets, squares, and crescents. These higher parts are considered the most eligible localities for a permanent residence; though, from being a good deal exposed to the south and south-west winds, which sometimes prevail with violence, they would be less adapted for visitors and invalids using the waters, than in the streets in the more immediate neighbourhood of the baths, in the lower part of the town, especially as Bath is comparatively little frequented in the summer months, the heat being at times oppressive. The climate, though somewhat rainy, is

mild in winter ; and on this account, as well as its agreeable environs, and the resources it offers for occupation and amusement, it is mostly resorted to from the months of November till April, many invalids using the waters throughout the winter.

The most interesting public edifices,—the abbey; the pump-room, where invalids and loungers assemble to drink the water, and to listen to the excellent musical band ; the baths ; the general hospital, and a large hospital for poor persons to whose cases the springs are applicable, all lie near to each other. The public baths, which, with a set of private baths, belong to the corporation, are, the King's Bath, the Queen's Bath adjoining the former, and supplied from the same source, though of somewhat lower temperature, the Hot-bath, and the Cross-bath. There is besides a tepid swimming bath, sixty feet in length, by twenty in breadth : these resemble the piscinæ at several of the continental baths, it being the custom to bathe in common, except that the gentlemen and ladies bathe on alternate days. All the public baths are emptied at night. The Hot-bath requires eight or nine hours to refill ; the King's eleven, and the Cross seventeen hours. Adjoining the baths are cabinets for

douching, which is called here dry pumping. The private baths are handsomely fitted up, each with a dressing-room adjoining; the *baignaires* being about eight feet long, four or five broad, and deep enough to admit of the waters reaching the bather's breast when standing up, so that they have in some measure the advantage of public baths, by enabling the person to move about freely while in the water. The temperature may also be regulated at pleasure, the baths being plentifully supplied with hot and cooled water. Most persons of the higher classes prefer the private to the public baths. Invalids formerly remained a much longer time in the water than at present, and I have no doubt that were this now the practice, a greater degree of benefit might be derived in many instances, as is seen at Leuk, and some other continental springs of high temperature, though containing but little saline or gaseous substances,

Persons in health use these baths, though in some, as well as in invalids, unpleasant symptoms are occasionally produced, especially if they be taken too hot. The number of those, however, who use the waters for health, is much less than at former periods, which may partly be ascribed to the circumstance, that so many re-

sort to the continental baths during the summer months, which is the most proper period for a course of mineral bathing; and partly, that the springs of Bath, instead of being in the country, surrounded with gardens and shaded avenues, are in the middle of a town which does not hold out many inducements to select it for a summer's residence. Invalids also in Bath must reside at a greater or less distance from the baths, instead of having them in their hotels and lodging-houses, as is the case at most of the continental springs.

The springs of Bath may vie with several of the most celebrated in Europe, both with respect to their antiquity, and the high reputation they have always enjoyed in a medical point of view. That they were known to, and used by, the ancient Romans, is evident from the discovery of baths and other remains of this people. They are the only ones among the English springs that can be termed hot—the range of their temperature being from 109 (Cross-bath) to 117 (Hot-bath); and no doubt, as Mr. Phillips has observed, they “may be considered as derived from one source, their temperature varying by their more or less circuitous passage to the surface;” which would also appear from the time required

to fill them; the Cross-bath, which is the most distant, requiring twice as long to fill as the Hot-bath. In point of temperature and sensible properties, the Bath water is not unlike that of Baden-Baden, or the Fontaine Nouvelle at Bagnères de Bigorre, sulphate of lime, as in the last-named spring, being the predominating salt, though in larger proportion. Neither of these springs, however, contain muriate of soda, which exists in the Baden water in the proportion of seventeen grains to the pint.

Sir C. Scudamore, after comparing his investigations with those of Mr. Phillips, states the following to be the composition of a pint of the water:

Muriate of Lime.....	1·2
———— Magnesia	1·6
Sulphate of Lime	9·5
———— of Soda	0·9
Silex.	0·2
Oxide of Iron.....	0·01985
Loss, partly by Carbonate of Soda	0·58015
	14 grains
Carbonic Acid Gas	1·2 cubic inches.

When first drawn, the water is clear and colourless, but it becomes decomposed after exposure to the atmosphere—its taste is slightly saline, and not disagreeable. Bathing is the most

essential part of the treatment, and does not produce the relaxation which follows repeated bathing in ordinary warm water. Falconer observes that the guides, many of whom remain several hours daily in the water, are in general vigorous, long-lived, and inclined to corpulency. The drinking of the water is, however, recommended in several complaints, and is mostly combined with the bathing; but the custom of drinking off the glass of water without hesitation, which is mostly followed at Bath, appears to me less calculated to produce beneficial effects, than that of drinking slowly, or sipping, as at most of the continental springs, by which means unpleasant sensations of distension of the stomach, &c., are obviated, and the water is more perfectly absorbed.

As may be supposed, numerous works have been written on the Bath waters; among the most recent and best is that of Dr. Barlow. Like several other mineral springs, those of Bath have been extolled in almost the whole range of chronic complaints, and numerous are the instances mentioned of persons who, on arriving, were obliged to be carried into the bath, unable to raise hand or foot, and who recovered their health and the use of their limbs in a sur-

prising manner. This is undoubtedly true in many instances ; but, on the other hand, little mention has been made of those who had left the place no better than they came, by which alone a proper and important estimate might be formed of the power of the waters.

Falconer, in the preface to his work, says, what is peculiarly applicable to writers on several mineral springs, " Those who have written specific treatises on the virtues of particular remedies, have contributed much to mislead the opinion of mankind concerning their efficacy. Medicinal substances seem to be selected as subjects of panegyric rather than of impartial examination. Sometimes unworthy motives, at others the caprice of prejudice joined with a sanguine disposition of mind, have contributed to cherish this empirical presumption, to corrupt the fountain of information derived from matters of fact, nearly as much as those which spring from the most fanciful theory. When we peruse the cases which have been the subjects of such trials, we are apt to think the character of the favourite remedy fully established, until melancholy experience replaces it in its true station, by teaching us that it is possible, by florid description, amplification of success, and suppres-

sion of unfavourable events and circumstances, to mislead almost as effectually as by advancing a positive falsehood.”

The Bath waters will find their application in most cases in which thermal springs have been found effectual; they might be employed with less risk of unpleasant consequences, than a spring of naturally higher temperature, and more saline and gaseous impregnation, which would be found more exciting, even though the temperature at which the bath is taken be the same in both instances; but, on the other hand, the latter would often cure diseases in which a slightly mineralised spring would fail. Compared, however, with some others, the Bath springs may be considered as possessing a not inconsiderable share of mineral impregnation. Some persons cannot even drink a glass or two without inconvenience, and a mild attack of gout, in those predisposed to this disease, is not an unfrequent consequence of their use. Gouty cases are among those in which these waters are most frequently employed, as indeed is the case with most thermal springs; and from all, a greater or less degree of advantage is usually obtained: the difference, however, would be—supposing the case to be suitable—that from the

use of a mineral water of high temperature, and strongly impregnated with saline and gaseous constituents, the effects would be likely to be more permanent, and relapses less liable to occur. I have had frequent opportunities to witness these beneficial effects at Wisbaden, where many persons advanced in life, and subject for years to gout, for which they had tried Bath and other springs, in some instances with considerable relief, have, after a course of the baths, continued free from the disease throughout the following winter, without having paid particular attention to their mode of living, and have returned to Wisbaden the ensuing summer in greatly improved health, to repeat the baths, more as a matter of precaution than from any existing necessity. On the other hand, I have known persons unable to use the Wisbaden baths, with whom those of Bath or Buxton have agreed very well. I also consider the employment of the Bath waters, subsequent to those of Wisbaden during the autumnal months, as likely to be useful in some cases. But it is not in all cases of gout that Bath is to be advised. In the more acute forms of the disease, in persons of full habit addicted to intemperance of diet, and whose digestive organs are a good deal dis-

ordered, the springs would be likely to do more harm than good, at all events, if employed without some preparatory treatment. It is in the more chronic forms in which most benefit is to be expected ; or, as Falconer says, “ in those sequelæ of gout which come on towards the decline of life, of an irregular character, and most usually in the winter months, which is attended with debility of the digestive organs.”

Sir C. Scudamore also considers the Bath waters as most suited to that chronic form of the disease “ in which there is great deficiency of nervous energy in the muscles, joined with a languid circulation in the extremities, and stiffness with aching pain in the joints upon every motion ; where the tendons are rigid and thickened, the ligaments wanting in elasticity, and the bursæ distended : in which there is no external redness, the feet frequently cold, the limbs seem to want animation, and require a high degree of stimulus.” In such a case, Bath might do very well, but I should be inclined to place more confidence in Wisbaden with respect to permanency of advantage and more speedy alleviation, provided there existed no undue degree of general irritation or debility to counter-indicate the use of its waters. In some cases of

the nervous kind, or of hereditary gout occurring in young and irritable subjects, even Bath might be too exciting, and a cooler spring less strongly mineralised, as Buxton, or one of the milder alkaline continental springs, would be preferable.

The opinion of Saunders (whose work on mineral waters, published at the beginning of the present century, is one of the best we possess in a practical point of view) on the cases of gout in which the Bath waters are calculated to be efficacious, is worth quoting. He says, “ In gout, the greatest benefit is derived from the Bath waters, in those cases where it produces anomalous affections of the head, stomach, and bowels. The principal advantage here is to be able to bring by warmth that active local inflammation in a limb which relieves all the other troublesome and dangerous symptoms. Hence it is commonly said, that the Bath water produces the gout, by which is meant, that when persons have a gouty affection shifting from place to place, and thereby disordering the system, the use of the Bath waters will soon bring on general increase of action, indicated by a flushing of the face, fulness in the circulating vessels, relief of the dyspeptic symptoms, and

the whole disorder will terminate in a regular fit of gout in the extremities, which is the crisis to be wished for."

In treating of the influence of a thermal spring, rheumatism naturally ranks next to gout in the catalogue of ailments it is calculated to relieve, and the Bath waters have not been wanting in their share of praise for their advantages in this disease; and no doubt great benefit may be expected from them in the more chronic forms of the disease, especially when attended with shifting pains, stiffness, rigidity, and partial contractions of joints, as also in that complication called rheumatic gout; a large proportion of the patients in the hospital labour under these complaints, which are mostly cured or relieved by the baths. In these cases the douching will be of material service in assisting the action of the baths, and in some cases local vapour baths may be conjoined with them. Sir C. Scudamore considers that in the generality of rheumatic cases Buxton is preferable to Bath, which, from its higher temperature, is more applicable "in cases where the circulation is languid, with cold extremities, and in which stiffness constantly prevails."

Falconer, Sir G. Gibbes, Dr. Barlow, and

other writers, speak highly of the Bath waters in paralysis, in which disease most thermal springs have been likewise recommended; but by this term is often meant a variety of conditions. It is frequently applied to the inability to move a part, or to the rigidity of a limb from gouty or rheumatic attacks; to the effects produced by metallic poisons or other deleterious substances upon the nervous system; to local injury of a part by which its motion is impeded; to the loss of power resulting from functional debility or disease of the nervous centres, viz. the brain or spinal chord; and also to that which is consequent upon apoplectic attacks. Thus, these various morbid states, which may be included under the generic term paralysis, require to be separately considered in estimating the action of remedies; thus also we may understand, when a similar term is made use of abstractedly, why a remedy which in one case has been productive of the greatest benefit, should in another be without effect, or even prejudicial, notwithstanding the similarity of symptoms in both cases to a superficial observer. When the paralytic symptoms depend upon effusion or disease of the brain, when they succeed an attack of apoplexy, baths of mineral

water will seldom produce more than slight amelioration, and may even do harm if used incautiously, or, in recent cases: when they are a consequence of gout or rheumatism, one of the stronger saline or sulphurous springs would be most likely to remedy them, provided there were no counter-indicating circumstances to their employment, such as a state of general debility or nervous irritability, in which case a thermal spring which could be used at the natural temperature, or which does not contain much saline substance, as Bath, Buxton, Plombieres, or Wildbad, would be more likely to benefit. When paralysis results from injury, either of a nerve or of the spinal chord, or from the excitement consequent upon excesses, the sedative actions of one of the slightly-mineralised springs would also be preferable, especially in young and otherwise healthy persons: when the symptoms depended upon the action of metallic poisons, as lead, mercury, &c., a sulphurous spring would in most cases be advisable. In all those cases to which mineral bathing is applicable, the cautious use of the douche will be of great assistance.

Both Falconer and Sir G. Gibbes likewise speak highly of the effects of waters in chlo-

rosis, and there is no doubt that the baths may be of great service, by promoting a freer circulation through the capillary vessels, determining more to the surface of the body, and improving the functions of the skin, which are generally impaired in this disease; the internal administration of the water might be advantageously combined with the baths, as preparatory to the employment of a chalybeate; the quantity of iron in the Bath water being too minute to be productive of any effect in improving the condition of the blood. The baths would also prove very efficacious in some of the slighter forms of cutaneous diseases, and also in some of the anomalies of the periodical functions in females dependent upon a congestive state of the internal organs, and combined with deficient action of the skin.

In the diseases which I have enumerated, bathing is the most essential part of the treatment; but there are various complaints in which the internal use of the water, alone or combined with the baths, has been found extremely efficacious. When the water agrees, the drinking is followed by an agreeable sensation of warmth, with increase of the appetite and spirits: it seldom produces any action on the

bowels, and not unfrequently constipates. When any sensible effects are experienced at the time, they are mostly evidenced by an increase of secretion from the kidneys. In some instances, feverishness, headache, a sensation of weight and oppression at the stomach, and loss of appetite, result from its use, which may depend upon the person's digestive organs being a good deal out of order, and requiring some preparatory treatment previous to commencing the course. In some plethoric or nervous individuals, similar symptoms are occasionally experienced on first drinking, and they may not unfrequently be prevented, by sipping the water and taking it cooler, instead of swallowing it hastily, as is often done.

Of the cases in which the internal use of the water is most recommended, may be mentioned visceral obstruction, especially of the liver, and a deficiency or vitiated state of the secretion of bile ; and also that variety of indigestion depending upon want of tone of the stomach, frequently occurring in elderly persons, and those of sedentary habits, with whom a chalybeate water would be likely to disagree. In the deranged state of the general health, from a prolonged residence in tropical climates, these waters would likewise

in many cases prove serviceable, as also in various other disorders, which I do not consider it necessary to enumerate under this head, as other mineral waters might be equally applicable to them, which would have to be determined according to the peculiarities in individual cases.

BUXTON.

THIS bath is situate in an elevated part of Derbyshire, the surrounding country being for the most part mountainous and uncultivated, though the immediate neighbourhood has been more cultivated, and a good deal improved within the last few years. It consists principally of an extensive range of houses termed the Crescent, built by the late Duke of Devonshire, and which produces a fine effect seen from a distance. A colonnade extends along the whole semicircle of buildings, affording a covered walk in wet weather. The accommodations are good during the season, which lasts from June till the beginning of October. In the principal hotel is a ball-room, where occasional reunions take place; but as it is not a pleasure bath, there is not much resource for amusement, though some places where interesting excursions may be made lie within the circuit of a few miles. In fine weather the air is bracing

and invigorating ; the transitions of temperature are, however, at times very great, and the north-east winds are occasionally severely felt. A good deal of rain also falls in the summer, though, from the dryness of the soil, the ground does not long remain wet. On account of the bleakness of its position, and the variations of weather, Buxton would not be a very eligible place for invalids late in the autumn.

The springs of Buxton have been used for centuries ; and from remains which have been discovered, there is every probability they were known to the Romans. In 1572 a Dr. Jones published an account of their virtues, and they appear at this time to have been a good deal frequented.* They are numerous, and yield a plentiful supply of water. The principal spring, termed St. Ann's Well, is enclosed in a stone edifice, and is chiefly used for drinking. When the water does not disagree, it is refreshing, by degrees producing a sensible improvement of the appetite and digestion, and " thus amending the functions of the stomach, conduces to the general strength of the body, and consequent cheerfulness and comfort of mind."—(Scudamore.) In general it does not produce any

* Short's History of Mineral Waters.

sensible effects at the time, beyond a degree of increased action of the kidneys. It is said to disagree with certain constitutions. Sir C. Scudamore, who has been in the habit of passing the seasons at Buxton, says, "It certainly happens, that simple as it appears in composition, it does prove inconveniently stimulating to some invalids of full habit and sanguineous temperament. They complain of flushing, headache, and slight giddiness, and are deterred by such symptoms from proceeding in the course of drinking it." But it is from its effects, in the form of bath, that Buxton has acquired its reputation. Besides the large bath for the use of the infirmary patients, there are three gentlemen's, and two ladies' baths; the principal gentlemen's bath is twenty-five feet long by seventeen wide; the baths are taken at the natural temperature of the water, about 77°F., (though at the spring it is 82°.) The private baths are among the most convenient in England, being neatly fitted up, spacious, and about five feet deep, so that the bather has sufficient space to move about freely. In these, the bath may be taken at the natural temperature, or, as is frequently the case, the water may be heated to any required degree. There

are also douching apparatus, and a cold plunging bath.

According to the analysis of Sir C. Scudamore and Mr. Gardner, a gallon of the water contains—

	Grains.
Sulphate of soda	0.76
Muriate of lime	0.62
—— of soda	2.16
—— of magnesia	0.70
Carbonate of lime	12.48
Extractive	1.44
	18.16

	Cubic Inches.
Carbonate acid gas, ...	1.8
Azote	5.57
	7.37

Thus it will be seen that the springs of Buxton contain very little more saline ingredients in a gallon of water than those of Bath in a pint. With respect to the amount of constituent parts, their nature approaches that of the springs of Wildbad, Leuk, Pfeffers, and Bagnères de Bigorre, being what the Germans call, “chemically indifferent thermal springs;” the above-mentioned continental springs would,

however, on account of their higher temperature, be more energetic in their mode of action, and thus applicable to a greater range of disordered states of health, than Buxton, though this latter would find its application in some cases with which the others might disagree.

On entering the water at its natural temperature, a slight sensation of chilliness is experienced, which, however, is shortly followed by an agreeable feeling of warmth, and, on coming out of the bath, most persons feel refreshed and invigorated. The baths are principally beneficial in chronic gout and rheumatism, where the object is not to produce too free an action of the skin, in which case Bath would be preferable. As at some other mineral springs, gouty and rheumatic pains are sometimes increased on first using the baths; but I should consider that in these diseases, though great relief might be experienced from the Buxton springs, it would in most cases require a longer time, and be of a less permanent nature, than even from the Bath waters, and still less than from a more strongly mineralised and hotter spring; though, as I have before stated, the more negative properties of the Buxton springs might render them better adapted to certain

cases of these complaints. Sir C. Scudamore considers them most applicable "in a rheumatic state of the constitution, unattended with fever, when the various textures concerned in muscular motion are so much weakened that the patient experiences lameness, stiffness, and irregular pains, more particularly in damp weather, or from a change of wind to the east." He also recommends, that "at first the stay in the bath should in no case exceed ten minutes, and in many instances one minute will be preferable." Saunders considers that the Buxton springs have no great advantage over common water, the principal recommendation being the copious supply of a very pure clear water, at the temperature of 82°. Internally taken, it would be useful in some forms of dyspepsia with irritability, especially in the kind arising from too free living. In some nervous disorders, and other states of deranged health, where the due equilibrium between the surface and internal organs is destroyed, the Buxton baths, and the bracing nature of its climate, would be likely to render effectual service.

CLIFTON.

THIS pretty town, containing a population of about twelve thousand inhabitants, lies within a mile of the city of Bristol, partly at the base, and partly on the southern acclivity, of a steep hill, and is surrounded by a highly picturesque and romantic country, through which the Avon flows towards the Bristol Channel, which is four miles distant. Scarcely any place in England offers greater advantages to invalids, with respect to localities and beauty of country. On the Downs the air is light, dry, and bracing; the walks and rides are varied and beautiful; the view of the woods on the opposite side of the river, (over which a suspension-bridge has lately been constructed,) and of the bold precipitous rocks by which its course is diverted, are strikingly fine. The botanist and geologist may find scope for the gratification of their tastes in the numerous rare specimens of flowers, fossils, spars, &c., with which the neighbour-

hood abounds. If retirement be sought, a person may live as secluded as he pleases ; or if he be desirous of occasionally mixing in the bustle of the world, the cities of Bristol and Bath (the latter by means of the railroad lately opened) may be reached in a few minutes. The most eligible situation for a residence are, in the higher parts, the York Crescent, the finest range of buildings of the kind in England, the Cornwallis Crescent ; in the less exposed and more sheltered parts, the Paragon, Albemarle Row, the Dowry Parade, and several streets in the lower part of the town. Thus, different classes of invalids may find situations adapted to their respective necessities, as Clifton is more sought for by persons labouring under pulmonary complaints for the advantage of its climate, than for the use of its mineral water. Sir J. Clark considers it the best climate in this part of England. In his work on Climate, he says, “ In its local advantages and geographical position, Clifton yields, perhaps, to no place in the kingdom as a residence for a large class of invalids. Within its own limits, it affords a sheltered winter, and an open, airy summer residence, while it is surrounded by numerous places of convenient and

agreeable resort in the fine season, suited to the various classes of persons who may seek its shelter during the winter."

The spring termed the Hotwell rises at the base of the lofty St. Vincent's rock, a little above the surface of the river, and is said to yield as much as forty gallons of water in a minute. It was enclosed in 1690 by the corporation of Bristol, though it was used medicinally even before that period, but of late years it has not been so much frequented. At the spring is the new Hotwell House, a neat edifice, containing a pump-room, with hot and cold baths. The temperature of the water is 76° F. Like the springs of Bath and Buxton, the salts of lime predominate. The following table will exhibit the proportion of the saline constituents in a gallon of water:—

	Grains.
Muriate of magnesia	7.25
——— of lime.....	3.80
Sulphate of lime	7.5
——— of soda.....	16.15
Carbonate of lime.....	13.5
	47.30

A gallon also contains, according to Dr. Carrick, thirty cubic inches of carbonic acid

gas, though there is no doubt that an analysis made at present would exhibit a different proportion both of solid and gaseous parts. The local accounts state that this spring was a good deal disturbed at the time of the earthquake of Lisbon. "It became suddenly red as blood, and so turbid that it could not be drank; the alarmed inhabitants of Bristol offered up prayers in church to avert the vengeance of heaven, of which this appearance was considered to be an indication. On the same day the water of a common well, in a field near St. George's Church, which had been remarkably clear, turned as black as ink, and continued unfit for use nearly a fortnight. The tide also in the Avon flowed back, contrary to its natural course."*

The water emits a few gas-bubbles when drawn into a glass: taken internally, it generally acts upon the kidneys, and occasionally produces vertigo and headache. It is recommended in various states of deranged health, but is seldom taken for any length of time consecutively, or as a regular course. The baths are not much used. The internal use of the water is considered to be very efficacious in cases of

* Clifton Guide.

dyspepsia with acidity, in affections of the kidneys, as diabetes, gravel, and tendency to stone. It has also been highly spoken of in bronchial affections and predisposition to consumption, though in these cases its influence has doubtless been materially assisted by the climate.

MALVERN AND MATLOCK.

THE village of Great Malvern lies on the declivity of one of the range of the Malvern Hills, the highest point of which, 1300 feet above the plain, commands an extensive prospect over the beautifully wooded and variegated scenery of Worcestershire, Gloucestershire, and part of Wales. Malvern is a good deal resorted to in the summer season, on account of the coolness of its situation, and the purity and clearness of its air. The houses are agreeably interspersed among gardens, orchards, and plantations, most of them being adapted for the accommodation of visitors. There is also a large hotel where many of the visitors assemble to dine at the table d'hôte. The village of Little Malvern is about three miles distant. There are several springs which rise from a limestone soil among the hills. The one most generally used is termed the Holy-well, and rises about two miles from Great, and one mile from Little

Malvern. There are baths at the well, as also lodging-houses for persons using the water, who would not like to reside so far off as the villages. A little higher up the hill is St. Ann's-well, which, however, is not much used.

The Malvern springs contain perhaps less solid substance than any others which can be termed mineral—little more than a grain to the pint; and as their temperature is scarcely tepid, they cannot be supposed to possess any very considerable remedial power. A standard German writer on mineral springs observes, with respect to these slightly mineralised waters—though his observations apply more particularly to those of a high temperature—“The more a water approaches to a state of chemical purity, so much the greater is its latent warmth : hence slightly mineralised baths are more exciting than those of common warm water. The purer a water is, so much the greater is its solvent power, it is more easily absorbed, excites the vascular system, and causes a greater degree of vital action, a higher grade of feverish reaction and crises in the secreting organs. This circumstance is of importance, where there is a preponderance of earthy matter, a want of power, and an alteration of the solid substance in all the textures,

with their consequences, a threatening of depositions and obstructions in these textures, in persons who have a torpid circulation: as it appears to be an axiom in the organization, that the more dense the textures, the smaller is the number of their vessels, and the more limited is their movement. Hence waters of this class are suited to old age, and possess a youth-restoring power, by imparting fresh flexibility and mobility, and strengthening the nerves, as may be seen wherever stiffness prevails, united with general weakness and local irritation.”*

The internal use of the water is in some instances attended with nausea, drowsiness, vertigo, and headache, which Dr. Wall ascribed to the same circumstance; viz. the great ease and rapidity with which a liquid in such a state of purity enters the absorbent system, and thus induces a temporary plethora. These symptoms, however, subside in a day or two, and may always be removed by the exhibition of a mild laxative. Dr. Wall considered the application of the water as very beneficial in painful scrofulous ulcerations attended with local irritation and fever; as also in a dry state of skin with fissures. This mode of dressing sores and wounds by

* Vetter. Heilquellenlehre. Berlin, 1839.

the simple application of water has of late years been revived in some of the London Hospitals, and is found preferable to other more complicated applications. The people in the neighbourhood of Malvern have long been in the habit of using the water as a lotion for inflamed eyes. Saunders also says, that the common people who resorted to the springs for cutaneous complaints, were in the constant habit of dipping their linen in the water, and putting it on quite wet; renewing the application as soon as the linen became dry.

A residence at Malvern and the use of its springs were likewise recommended by Dr. Johnstone of Worcester in scrofulous and nephritic complaints, and some cutaneous eruptions: he also observed that the purity of the water and the air, and temperate nature of the climate, rendered it a favourable locality for consumptive persons, and those labouring under nervous disorders.

The cool springs of Matlock are of very analogous nature with those of Malvern: their temperature is 66° or 68° F., and they can scarcely be said to differ from common spring water. The village is situate in the most romantic part of Derbyshire on the acclivity of a hill at the

base of which flows the Derwent, and is a good deal resorted to in the summer and early autumn. Besides the private warm baths, there are two large public baths, in which persons bathe at the natural temperature of the water.

COLD SPRINGS.

HARROWGATE.

HIGH and Low Harrowgate are situate on a rising ground, at the extremity of an extensive plain, and are distant half a mile from each other, twenty miles from the city of York, fifteen from Leeds, and three from the market town of Knaresborough. From High Harrowgate an extensive prospect of the surrounding country, including the towers of York cathedral, may be enjoyed. Harrowgate is one of the watering-places most resorted to, not only by persons resident in the northern counties, but also by many from the metropolis, and other parts of the kingdom. During the season, which lasts from June till the end of October, a weekly list of the visitors is published; the number on an average amounts to about 12,000. The resident population, which has greatly increased of late years, is now estimated at near 5,000. The

number of lodging-houses amount to about 200, including hotels and boarding-houses.

The springs of Harrowgate have been employed medicinally from a very early period. Dr. Stanhope published an account of them so early as 1632.* Twenty years later another work on the "Yorkshire Spaw" was written by a Dr. French. Short speaks also of Harrowgate in his "History of Mineral Waters," published at the end of last century; and more recently Doctors Walker and Garnett have published special treatises on the virtues of the waters. Sir C. Scudamore also gives an account and analysis of them in his work, and Dr. Hunter of Leeds has also written on and analysed them.† As his work is the most recent and best, I have derived much of my information respecting the locality and composition of the springs from it; my occupations not having

* The title of Dr. Stanhope's work is "Cures without care, or a summons to all such as find little or no help by the use of physic, to repair to the Northern Spaws, wherein, by many precedents of a few late years, it is proved to the world that infirmities, of their own nature desperate and of long continuance, have received a perfect cure by virtue of the mineral waters near Knaresborough."

† "The Waters of Harrowgate and its Vicinity" by Adam Hunter, M.D. Fifth Edition, 1838.

permitted me to visit Harrowgate during the season.

Dr. Hunter divides the Harrowgate springs into four classes. 1. Springs impregnated with sulphuretted hydrogen gas and saline matter. 2. Saline chalybeate springs. 3. Pure chalybeate ; and, 4. Springs containing earthy salts with little iron and no sulphuretted hydrogen.

To the first class belong the old sulphur well, Thackwray's garden-spring, the Crescent new spring, the Starbeck or Knaresborough sulphur-spring, and the hospital-well.

To the second class belong Williams' (late Oddy's) saline chalybeate or Cheltenham.

To the third, Oddy's chalybeate, the old spa, Tewit, St. George's, and Starbeck springs.

To the fourth, the Crescent old well, the Crescent Hotel saline spring, and the Knaresborough dropping-well, celebrated for its petrifactions. All the sulphuretted springs except the Starbeck rise in Low Harrowgate. The old sulphur well is encircled with rising grounds, partially and irregularly covered with buildings, and rises from the base of a considerable ascent into a circular stone basin, surmounted by a dome ; its water is principally used for drinking,

and is transparent, very sparkling, imparting a sensation of cold to the palate ; it has the peculiar smell of sulphuretted hydrogen, and tastes disagreeably sulphurous and saline, though persons soon accustom themselves to it. Its temperature is 49° F. On being exposed to the action of the atmosphere, it soon becomes decomposed and deposits a sediment. It discolours and corrodes metallic vessels, and silver is speedily tarnished by the gas exhaled from the water.

Thackwray's garden-spring rises about two hundred yards from the old sulphur, and is surrounded by the pleasure-grounds of the Crown Hotel. It has less saline substance than the former spring, but is rather more strongly impregnated with sulphuretted hydrogen. The Crescent new spring is principally used for baths. The Starbeck is the weakest, both in saline and gaseous impregnation, but is a good deal used. It rises at about an equal distance between Knaresborough and Harrowgate. Here is also a cottage, with shrubberies, baths, and a light chalybeate spring, forming the Starbeck establishment.

The following are the contents of an imperial gallon of water, from the old well, according to Dr. Hunter's analysis.

	Grains.
Chloride of sodium.	867·2
———— calcium.	87·2
———— magnesium.	42·4
Bi-carbonate of soda.	20·
	————
	1016·8

	Cubic inches.
Sulphuretted hydrogen gas.	15·64
Carbonic acid.	2·72
Carburetted hydrogen.	6·8
Azote.	8·84

Saline Chalybeate or Cheltenham.		Pure Chalybeate.	
	Grains.		Grains.
Oxide of iron.	5·3	..	1·8
Chloride of sodium.	576·5		5
———— calcium.	43·5		6
———— magnesium.	9·65		4
	Cubic inches.		Cubic inches.
Carbonic acid.	$5\frac{3}{4}$		5
Azote.	$7\frac{3}{4}$		8

The pure chalybeate contains also a minute portion of sulphate of soda, but not more than half the quantity of iron than in the old spa, in which the other salts are chiefly carbonate of lime. The Tewit spring (so called from the lapwings that constantly hover about it) has nearly as much iron as the old spa; but is now very little used. The Starbeck chalybeate has

only three-quarters of a grain of iron to the gallon of water.

Of the fourth class of springs, the Crescent saline contains 680 grains of chloride of sodium, 53 carbonate of soda, 44 chloride of calcium, and about the same quantity chloride of magnesium, to the gallon. The Crescent old well is much less strongly impregnated.

Besides the above, there is another so-called Cheltenham spring, belonging to Mr. Thackwray, which is a good deal used: the solid contents in a gallon are—

	Grains.
Oxide of iron.....	2·1
Chloride of sodium.....	192·
———— calcium	148·8
———— magnesium...	83·3
Carbonate of soda	10·8
	437

The waters are chiefly used for drinking, though baths have been much more generally employed within the last few years. Besides the Victoria establishment, there is now that of the Montpellier baths, a handsome edifice surrounded by pleasure-grounds, and containing a central promenade room, supplied with newspapers and periodicals; and on either side, ladies' and gentlemen's baths, neatly fitted up

and convenient. There are besides, shower, douche, vapour, and hot-air baths. Several springs rising on the premises supply the baths by means of a double forcing pump affixed to a small steam-engine, the water being heated by steam. There is also at Harrowgate a hospital, containing fifty beds for poor persons from a distance, to whose cases the waters are applicable.

It will be seen from the analysis, that the muriates of soda and lime are the predominating ingredients, varying in their proportion in the different springs, by which means they may be adapted to various indications and constitutions. With respect to the sulphurous springs, there is no doubt but that they are of the kind which M. Fontan terms accidental; viz. that the sulphurous impregnation is acquired by a saline spring passing through a layer of mud, or animal or vegetable matter, in a state of decomposition.* The spring Pinac at Bagneres de Bigorre (where all the springs are saline) was ascertained to contain a certain proportion of sulphuretted hydrogen, and it was considered that a valuable sulphurous spring, resembling those in other parts of the Pyrenees, had been

* Recherches sur les eaux minerales des Pyrenees. Paris, 1838.

discovered: but on investigating the matter more closely, it was found that the water rose through a drain in the ground-floor of a house, and on the drain being cleared, the sulphurous properties of the spring were destroyed. Most cold sulphurous springs would be found to have a similar origin. This is the case at Moffat, where the water passes through a bog of vegetable matters, and the springs of Harrowgate are similarly situated. Saunders says, in his work—"The sulphurous springs all appear to take their rise from a large bog at a short distance from the wells; the bog consists of the remains of decayed vegetable matter forming a black, fetid, half-fluid mass, in many places four or five feet deep, which everywhere rests on a bed of clay or gravel. From hence the water appears to pass underground through a stratum of shale, and having undergone a natural filtration in its passage, it rises perfectly transparent at the wells, where it is received for the use of the numerous invalids." Dr. Garnett and others hold the same opinion, in which, however, Dr. Hunter does not concur; but I have no doubt, that if the bog could be cleared, these springs would lose their sulphurous property. This appears to have been the case with the Crescent

old well, which Dr. Garnett states contained formerly in the gallon thirteen cubic inches of sulphuretted hydrogen and two grains of iron, whereas at the present time there is no trace of iron, and the smell of sulphuretted hydrogen is only occasional and very slight.

The water of the old sulphur well, like many other cold saline springs which contain but little gas, bears exportation well, and is sent to several of the neighbouring towns. From the larger quantity of salts its action is more aperient than that of the saline chalybeate, the active properties of which are frequently increased by the addition of some of the concentrated solution of the salts, or by heating it, by which the carbonic acid is disengaged, and the iron precipitated; though by these processes the alterative and tonic properties of the water are materially impaired. This, and the other so-called Cheltenham spring, differ from the springs of Cheltenham and Leamington in not containing the sulphate of soda which the latter possess in considerable proportion. Their mode of action cannot consequently be regarded as analogous, though they might be more applicable to some cases than the Cheltenham waters.

The pure chalybeates containing but a very small quantity of iron and gas, are not to be compared with most of the continental chalybeate springs, where these substances exist in much larger proportion, and where the water is very generally employed in the form of bath as well as internally. It will be seen that they have great analogy with the Tunbridge Wells water, and may be useful to persons requiring a light tonic, who may happen to be in that part of the country.

Neither will the sulphurous springs bear a comparison with the continental ones, which for the most part are not only much more strongly impregnated with sulphur, but in which the amount of saline substance is not so great as to overpower its specific action ; as, for example, the Aix-la-Chapelle springs, which contain seven times as much sulphuretted hydrogen, and which frequently induce slight constipation, by which the sulphur is more completely absorbed into the blood ; whereas, in the old well of Harrowgate, the salts are in such excess as in most instances to produce an immediate excitation of the mucous membrane of the alimentary canal, and the sulphur has but little share in the action.

Thus these may be considered as saline springs, with an accidental slight impregnation of sulphuretted hydrogen; and though not ranking among the proper sulphurous springs, they may nevertheless be very efficacious in many diseases, as has been demonstrated by experience. The complaints in which these springs may be more particularly recommended, are some deranged states of the digestive organs with vitiated secretions, and an inactive state of the liver and bowels; hemorrhoidal tumours from obstructed circulation through the abdomen; chronic gout, attended with stomach disorder, and from too free living; some obstinate cutaneous complaints, in which the baths are most efficient.

Very little of Dr. Hunter's work is appropriated to the medical application of the water. Of the diseases of the skin in which it is likely to be beneficial, Dr. Hunter mentions lepra, psoriasis, porrigo, herpes, and impetigo. He says, "it speedily and safely carries off the effects of intemperance in those who, having spent the winter and spring in festivity, resort to Harrowgate with their system loaded with impurities from the excesses of the table, and whose stomach are debilitated by these and

similar causes. Its use is acknowledged in those predisposed to apoplexy. In chlorosis, it has been usual to drink the sulphur-water for some time, and then to take the chalybeate." Scrofula, scurvy, secondary syphilis, gout, regular, irregular, and atonic; hypochondriasis, jaundice, chronic rheumatism, stone and gravel, are also among the diseases enumerated.

CHELTENHAM.

THIS handsome town is situate in the vale of Evesham, and is sheltered on the north and east by the Cotswold hills. It is distant ninety-four miles from London, and nine from the city of Gloucester ; the population amounts to about 30,000 persons, and the annual number of visitors is little less than 12,000. It is built on a clayey soil ; hence the ground in the neighbourhood often remains long wet after rain, except on the gravel walks. The climate in winter is, however, in general fine and mild ; but the heats in June, July, and August, are at times oppressive, on which account several of the residents leave it till the autumn. The winds from the west and south-west are most prevalent, and are at times severely felt in the spring months. On the whole, Cheltenham is a healthy place for a permanent residence. It

agrees very well with old East Indians, and many of the inhabitants are long-lived. The surrounding country is beautiful and open, and the public promenades, especially the Old Well walk, the Montpellier, and Pittville grounds, are not to be excelled by those of any other watering-place in England.

At the Montpellier baths common water is used, the mineral springs of Cheltenham being exclusively employed for internal administration. They are numerous, and though for the most part resembling each other, as to the nature of their component parts, yet present considerable differences in the relative proportions of their ingredients. They are rich in muriate and sulphate of soda; several of them contain a small portion of iron, and iodine has been lately detected in them. They are but slightly gaseous, and though two or three of them have, when first drawn, a slight odour of sulphuretted hydrogen, it soon passes off, and is probably dependent upon the springs passing through a layer of mud, or matter in a state of decomposition. It must not therefore be supposed that the so-called sulphuretted wells are analogous in their action with the class of sulphurous springs.

The following is the analysis of the water at the Old Well:—

Solid Contents in a Pint.

	No. 1.	No. 2.	No. 3.	No. 4.
Muriate of Soda	58·20	22·60	17·60	47·80
— Lime	6·21	3·68	3·08	4·29
— Magnesia ...	2·54	5·16	3·30	7·30
Sulphate of Soda.....	14·56	52·32	43·20	59·20
	—	—	—	—
Grains	81·51	83·76	67·18	118·59

Another spring, containing only a small quantity of aperient salts, but exceedingly rich in common salt, was opened in 1823; and on being analysed by Mr. Faraday, a pint of water was found to yield—

Carbonate of Lime	1·6
Sulphate of Lime	14·5
—————Magnesia	12·4
————— Soda	3·7
Muriate of Soda	97·0
	—
Grains	129·2

Notwithstanding the small proportion of the sulphates of soda and magnesia, this water will often produce a purgative effect, as will also

waters containing muriate of soda without any admixture of aperient salt, especially if a large quantity be taken at a draught ; while the same or even a larger quantity, if sipped slowly at short intervals, will be more likely to have a different and often imperceptible effect.

The Montpellier Spa waters have been more recently analysed by Mr. Cooper, with results differing in some measure from those obtained by previous examinations. According to this chemist, iodine in combination with soda exists in the springs of this establishment, and would probably be found in others on more minute investigation. That this substance should have remained undetected till lately, and that the analysis by different persons should yield such different results, are circumstances indicating the obscurity which exists on the subject of mineral waters, and the necessity of further inquiries, both by means of a more minute chemical examination, and by professional men studying the uncombined action of these agents on the animal economy.

The following are the contents of a pint of water from each of the Montpellier springs, according to Mr. Cooper :—

	No. 1.	No. 2.	No. 3.	No. 4.	No. 4. A.	No. 5.	No. 6.
Muriate of Soda...	27·0	35·3	32·3	52·4	51·4	9·7	58·7
Sulph. of Soda ...	14·7	28·4	26·5	17·2	14·0	...	12·3
——— Magnesia	4·0	7·2	6·1	14·2	17·1	47·0	...
——— Lime ...	1·3	3·1	3·3	2·7	2·1	3·1	2·0
Bicarbonate of Soda	1·1	...	...	1·2	2·4	1·7	1·8
Oxide of Iron	0·3	0·42	0·41	...	...	0·4	..
Hydriod. of Soda..	trace	0·15	0·15	trace	0·25	0·35	0·2
Muriate of Lime..	..	..	..	..	8·3	13·1	9·3
——— Magnesia	..	..	..	..	7·5	10·5	4·5
Carb. of Lime & Mag. ...	..	..	..	1·1	3·2	..	..
Grains	48·4	74·57	68·76	88·8	106·25	85·85	88·8

	Cubic Inches.						
Carbonic Acid Gas	2·5	0·4	0·4	1·4	1·16	1·2	0·7
Sulphuret. Hydrog.	..	1·6	0·7	..	trace	..	..

This analysis differs very materially from that given by Sir C. Scudamore in 1820, and still more from that by Brande and Parker, three years previously. It is not worth while, however, to enter into the details of these discrepancies, as it would be of little service in guiding the practitioner in the employment of the waters.

Contents of a pint of the stronger Pittville Spring, according to Mr. Daniell.

Muriate of Soda	48·6
Sulphate of Soda	20·2
——— Magnesia.....	5·5
Bicarbonate of Soda	5·6
Carbonate of Lime.....	1·0
Bromine	a trace

Grains 80·9

Carbonic Acid, Cubic inch 1·0

This variety in the relative proportions of the mineralizing ingredients in the different springs, enables the practitioner to adapt them to different indications in particular cases, though many persons are guided in the selection of a spring by fashion or caprice, more than by other considerations, and prefer acting on their own judgment to consulting a professional adviser. In general, from half a pint to a pint of the water taken before breakfast will produce some effects on the bowels or kidneys, varying according to the spring employed, the constitution of the individual, and other circumstances.

Besides its saline springs, Cheltenham possesses two chalybeate ones, which, like others of the same class, have a disagreeable inky taste, and are somewhat dark coloured. From their not containing much carbonic acid, they do not sparkle, and are soon decomposed on exposure to the atmosphere. According to the analysis made some years ago, a wine gallon of the Cambray spring contains :

Carbonate of Iron.....	7.05
Muriates of Lime and Magnesia.....	13.50
Muriate and Sulphate of Soda.....	24.00
Sulphate of Lime.....	9.00
Carbonates of Magnesia and Lime..	8.95

Grains 64.50

Carbonic Acid..... Cubic inches 24.00

If this analysis be correct, which I very much doubt, this spring would be the most powerful of the kind in England, and would greatly exceed that of Tunbridge Wells, both in the amount of iron and salts, as also of carbonic acid. At all events, these springs are evidently strongly chalybeate, and are applicable to several of the cases in which waters of this class are indicated.

Compared with the continental springs of the same class, those of Cheltenham may be likened to Sedlitz, Saydchut, and Püllna; but they contain less of the aperient salts, and on this account, as also from the addition of the iron, they may be taken for a longer period without inducing the debilitating effects likely to result from a prolonged course of the above-named continental springs. Some of the Cheltenham springs resemble in point of temperature and amount of saline constituents the saline springs of Marienbad, and the Salzquelle, at Franzensbrunn. They do not, however, contain free carbonic acid, or at all events this gas is in very small proportion, while it is very abundant in the Franzensbrunn and Marienbad springs, which circumstance must have a very material influence upon their operation, and would ren-

der them applicable to persons with whom a water strongly impregnated with carbonic acid would disagree, especially those labouring under some subacute diseases. Gouty patients, of a plethoric or irritable habit, and those affected with functional derangement of the liver and digestive powers, induced by too free living, or from a long residence in unhealthy climates, would be likely to derive more advantage from a course of Cheltenham waters than from the more gaseous springs.

They are likewise applicable to some cases of amenorrhœa, and chlorosis, where a faulty condition of the digestive organs exists, and are highly efficacious in many cases of derangement of the digestive apparatus, with inadequate or vitiated secretions, piles, and eruptions on the skin, especially about the face, both on account of their aperient and alterative properties. From the manner in which the Cheltenham water is usually taken, its efficacy would appear to be considered proportionate to the sensible action which it produces on the bowels. Mineral waters in general, are, however, alterative remedies *par excellence*; and by their imperceptible operation frequently produce more benefit when no very sensible effects are experienced

at the time, than when the reverse is the case. A medicine tending to produce active increase of the secretions, as purgation or sweating, used during several successive weeks, would be but little calculated for the removal of those chronic complaints to which a course of mineral waters is applicable; and although its exhibition might be attended with temporary relief, the patient would probably find himself, after a certain period, in a condition no better or worse than when he began. This alterative action, which is best calculated for the permanent alleviation of chronic disease, would be better obtained in the case of the Cheltenham water, as in others, by its being sipped slowly, instead of being tossed off like a dose of physic, as is generally done. By drinking the water slowly, and at the natural temperature, each portion that is swallowed comes successively into contact with the mucous membrane of the stomach, and acts as an alterative and tonic; much of the bracing quality of the water depending upon its low temperature, and being lost by warming, which must also have the effect of in some measure decomposing it.

There are some other diseases in which the Cheltenham springs may be used with advan-

tage, as deposition of gravel in the urine, of the lithic acid variety, which so often depends upon a disordered state of the assimilative powers. Persons who have lived in India, and other tropical climates, who have been accustomed to take large doses of mercury, will occasionally require a dose of this medicine, though its too frequent repetition is not to be recommended.

One of the best works on the Cheltenham water is that of Dr. Gibney.

LEAMINGTON.

THIS small town lies in a beautiful part of Warwickshire, two miles from Warwick, and six from the ruins of Kenilworth Castle. The accommodations are of the best kind, and the climate is, on the whole, good in the autumnal and winter months, at which time Leamington is most frequented. It possesses a handsome pump-room, and three or four establishments for baths, the mineral water being occasionally used for bathing. Here, as also at Cheltenham, there is a manufactory of salts from the springs, which are largely exported.

*Analysis of a pint of water from Lord
Aylesford's spring.*

Sulphate of Soda	40·398
Muriate of Soda	40·770
—— of Lime.....	20·561
—— of Magnesia.....	3·266
Grains	105·995

Carbonic Acid	Cubic inches	2·103
Azote		0·537
Oxygen		0·075
		2·715

There are here also great discrepancies between the analyses of Sir C. Scudamore and Dr. Thompson, into the consideration of which I do not feel myself called upon to enter. Dr. Thompson, however, considers that Reid's sulphurous spring contains as much as thirty-eight cubic inches of gases, of which twenty-five are carbonic acid and nine sulphuretted hydrogen, to the gallon of water, which must have a material influence in its action. Some of the springs contain a small portion of iron.

The mineral springs of Leamington have great analogy in their nature and mode of action with those of Cheltenham ; they contain, however, a larger proportion of the sulphate of soda, and the muriates of lime and magnesia, as also of carbonic acid. Hence their operation is more energetic, which renders them better suited to those cases where a torpid habit exists, or which are not easily acted upon, than to others in which great irritability or susceptibility of temperament, or of particular organs, prevails.

They may be recommended for similar complaints as the Cheltenham waters, particularly stomach derangement without inflammatory complication, hepatic obstruction, acne and other eruptions about the face, as also in chronic gouty cases, especially when constipation of the bowels co-exists. In these cases the action of the water upon the constitution, and in relieving local symptoms, is materially assisted by the use of the warm-bath. The heated mineral water is more stimulating than ordinary water, and is often to be preferred, but should not be employed where there exists a tendency to cerebral congestion, or to visceral inflammation, in which cases the internal exhibition of the water will require great caution, and generally some preparatory treatment. In some cases of menorrhagia, and affections of the kidneys, with deposition of red sand or gravel in the urine,—a course of Cheltenham or Leamington water will be attended with great benefit.

The remarks which I made with respect to the mode of taking the Cheltenham water are equally applicable here. By sipping the water slowly, and at the natural temperature, it will agree with many stomachs which would not be able to bear it if a large quantity were drank off

at once. Neither would it be advisable in ordinary cases to make any addition of salts or other medicaments; and even should the water not produce any sensible action on the bowels, if they be not constipated, it will perhaps not be the less efficacious on that account, as a slight diuretic or diaphoretic effect, probably not remarked by the patient, may be produced, and its alterative property, by improving the state of the secretions, and giving tone to the parts, will often do more good in some cases of long-standing disease, than when its action is attended with active sensible effects upon the digestive organs.

But little benefit can be expected unless a proper system of regimen be followed while a person is under a course of mineral waters, especially of this kind. The not duly attending to this point is a frequent source of disappointment to individuals, who are apt to expect everything from the course of medical treatment they are pursuing, and who are unwilling to sacrifice their accustomed enjoyments to promote its efficiency. It is not, however, my intention to enlarge upon this point. I will therefore refer those desirous of more detailed information respecting the drinking the waters, to the works of Drs. Loudon and Gibney.

TUNBRIDGE WELLS

Is one of the most agreeable retreats in England, in the summer and autumnal months, being only thirty-six miles from London, six from Tunbridge, and lying partly in Kent and partly in Sussex. The town is built for the most part in a valley between two hills, Mount Ephraim and Mount Sion, on which are numerous detached houses and gardens. On the common fronting the town, the air is light, dry, and bracing, and this is the most usual resort of pedestrians and donkey riders. The most eligible part, however, for a few weeks' residence, is the new Calverley quarter, consisting of a splendid hotel, the terrace of which commands a beautiful prospect; a crescent and colonnade, streets, detached houses, a park, &c., about half a mile from the town.

The drinking spring rises at the end of the parade, (a row of trees on one side, with shops and a colonnade on the other,) below

an edifice formerly a public bath, but of which half is partitioned off and transformed into a shop; the other part is now the plunging bath, a large reservoir of water in a vaulted chamber, of a red-ochrey colour, and at the natural temperature, into which the bather merely takes a plunge for a second or two. It is obvious that it is only a few persons to whom this mode of bathing would be suited; and whatever may be the tonic effects of the cold and the bracing quality of the bath, the mode of action would be very different from bathing in a chalybeate water made tepid, containing a comparatively large proportion of iron and gas, and in which the bather may remain for an hour, during which a not inconsiderable portion of the water is absorbed. In fact, at some of the continental chalybeate springs, as much reliance is placed in many cases upon bathing as upon drinking. Adjoining the cold-bath are two cabinets for baths of tepid, chalybeate, or common water.

The water has a decided chalybeate taste, which, from the small quantity of iron it contains, (about a quarter of a grain to the pint,) could only be apparent from the almost total absence of saline substance. The carbonic acid is also in very minute quantity, just sufficient to

hold the iron in solution ; as, shortly after remaining exposed to the air, the water becomes decomposed, and an ochrery sediment is deposited. It cannot, therefore, be compared with some of the continental springs which contain the iron, saline, and carbonic acid, in much larger proportion. Its action is, notwithstanding, eminently tonic, and it not unfrequently occasions constipation which requires to be obviated by medicine. Headache, drowsiness, and other unpleasant symptoms, are also sometimes caused by drinking it, which may depend upon the person's not being in a fit state, and requiring some preparatory treatment.

The tonic effects produced by so small a quantity of iron as exists in chalybeate springs, is accountable for by its combination with the carbonic acid gas, and its minute subdivision, by which it is the more readily taken up by the mouths of the absorbents. Some analyses exhibit in chalybeate springs a comparatively large portion of iron, as two or three grains to the pint ; these, however, are generally erroneous. M. Orfila found that a single grain of carbonate of iron, dissolved in twenty ounces of water, imparted to it a strong and disagreeable inky taste ; and it is most pro-

bable, when a large quantity of the metal is taken in pharmaceutical preparations, almost all of it passes off by the bowels.

Waters containing more iron, with little saline and gaseous parts, act so as to produce an astringent effect upon the mouths of the absorbents, which prevents their being received into the circulation, and often gives rise to unpleasant symptoms. That the iron when in such a dilute state is received into the blood, is evident from the effects of baths of chalybeate waters in chlorosis, and the increased colour in the cheeks of such patients,—hence the advantage of combining bathing with drinking. In some cases, also, where the internal use of the water cannot be borne, considerable advantage is derived from the use of baths alone. Thus, where a course of chalybeates is indicated, the preference should, if possible, be given to those in which the iron exists in combination with a certain amount of carbonic acid and salts, and which may also be used in the form of bath.

With some persons, however, the presence of much carbonic acid gas in a mineral spring would be likely to disagree; and where the object is not to obtain the absorption of iron into the system, but chiefly to give tone to the stomach,

a water like that of Tunbridge would answer the purpose very well. Thus, in simple debility of the digestive organs, generally indicated by a pale and flabby state of the tongue; in states of muscular relaxation, either from dissipation or a too sedentary mode of life, &c., a water of this kind, with the pure air of the country, would be eminently serviceable—as also in hypochondriasis of the purely nervous kind, not attended with constipation, or a materially deranged state of the secretions,—and other nervous disorders. Where, however, much derangement of the digestive powers exists, or a tendency to visceral congestions, the water would not be likely to benefit. In nervous affections, likewise, it frequently happens, that although no local disease can be detected, the susceptibility of the system is too great to admit of even so light a tonic as the Tunbridge Wells water, and in these states much harm is sometimes occasioned by persisting in the exhibition of tonics when a more sedative treatment is required in the first instance; after which, tonics in small doses may be given with advantage; the use of the tepid bath will be of material assistance in these cases. In some conditions of the system attended with debility, the combination of a tonic and deobstruent, as in the Cheltenham or Har-

rowgate springs, would be most applicable. A pure chalybeate water, like Tunbridge Wells, would also be serviceable in some relaxed states of the air-passages, without inflammatory complication, as is frequently seen in elderly persons—as also in weakly children of a scrofulous habit, but where there is no manifestation of local disease, though in these cases a more gaseous water would be preferable. Most mineral waters, and especially chalybeates, are contra-indicated in plethoric individuals, in those of rigid fibre, with tendency to congestions in the head, thoracic or abdominal viscera, as also in cases of organic alterations, dropsy, or pregnancy. When they agree, they produce a feeling of invigoration, with increase of appetite, digestive power, and muscular strength, without inducing headache or other unpleasant symptoms. Chalybeate waters should always, if possible, be taken at the spring, as they do not bear being sent to a distance.

SCARBOROUGH

Is a neat town, built along the bay of the same name, on the Yorkshire coast, a good deal frequented in the summer months for sea-bathing. It possesses two mineral springs, termed the North and South Wells, which have been analysed by Dr. Thompson, according to whom they contain the following proportion of salts in a gallon of water, and also a small portion of iron and carbonic acid gas.

	South Well.	North Well.
Sulphate of Magnesia.....	22·41	105·94
———— Lime.....	147·12	47·64
Muriate of Soda.....	25·36	7·23
———— Lime		38·
———— Magnesia.....	3·88	..
Carbonate of Lime	9·97	..
	208·74	198·81

It will be seen, on comparing the analysis, that the saline constituents are the same as in the Cheltenham springs, though the proportions are much less. The South Well is less aperient

and more tonic than the North Well, both from its containing more iron and a much less quantity of sulphate of magnesia. Many persons combine the use of these springs with sea-bathing.

BRIGHTON.

THIS handsome town, the most frequented of all the English watering-places, contains a fixed population of between 40 and 50,000 inhabitants, and in the bustle and movement of its streets presents the appearance of a capital. The buildings extend nearly three miles along the cliffs, the eastern part being much more elevated than the west. The streets in the interior of the town, except in the neighbourhood of the Pavilion, are mostly occupied by shopkeepers. Most of the resident families and visitors live on the Parade, or in the squares. The warmest situation in the winter months is at the western end of the town, which is less exposed than the houses on the East Cliff, though for those who require a more bracing air, this part would be preferable.

There is little to interest in the environs of Brighton, which are for the most part extensive downs, presenting a bleak and cheerless aspect ; the soil is chalky, and the ground soon dries after rain. There are properly two seasons at Brighton ; viz. from June till October for the sea-bathing, and from October till April, after which the town is comparatively deserted by visitors. In the spring months the winds (chiefly the west and south-west) are often extremely high, and render the more exposed parts of Brighton unpleasant as a residence. In the summer, the sun's rays being reflected from the cliffs and white buildings, render the heat at times oppressive ; but in the autumnal months, from September till the end of the year, the climate is delightful, the air being dry and bracing, the sky generally clear,—though even at this time storms and cold winds are occasionally prevalent for several days together.

Brighton has the advantage of possessing several bathing establishments, where fresh, sea medicated water, and vapour baths may be had. There is also a large public swimming bath.

At Wick, about a mile west of Brighton, is a chalybeate spring, the water of which is drank by some of the summer visitors. The following

are the contents of a pint of water, according to Mr. Daniell:—

Sulphate of Iron	1·66
————— Lime	1·78
Muriate of Lime	1·71
————— Magnesia ..	0·44
————— Soda	1·36
	6·95 Grains.
Carbonic Acid Gas	2 cubic inches.

Judging from the composition of this water, though it might suit some persons requiring tonics, it would not be adapted to very weakly individuals, or those whose stomachs were very delicate. In my former work I compared it with the water of Bruckenuau, which I had not at that time visited ; but, in fact, no two springs belonging to the same class could present a greater difference. The Bruckenuau contains less than half a grain of iron to the pint, with scarcely any other solid matter, and upwards of thirty cubic inches of carbonic acid gas.

The principal cause of Brighton having risen so rapidly, from being little more than a village, to a town of such importance, is its being the nearest part of the coast to London, which induced George IV. to build a palace, and crowds of Londoners to resort to it for bathing

and inhaling the sea-air, the facilities for which will be materially increased next year by the termination of the railroad, which will bring the sea within two hours of London. The beach is, however, shingly and steep, and the bathing consequently not so good as at Worthing, ten miles west of Brighton.

Baths of sea-water are very analogous in their action to those of some mineral springs, containing a large quantity of muriate of soda, as Salzhausen, Kreutznach in Rhenish Prussia, and Ashby de la Zouch in England. The quantity of saline substance in sea-water varies considerably in different seas, and in the same sea in different parts, being greater at a distance from shore, and in deep water, than on the surface. Besides muriate of soda, sea-water contains muriate of magnesia, sulphate of soda, and other salts in minute proportions, as well as iodine bromine, and animal and vegetable matter.

Tepid bathing in sea-water is useful in several chronic complaints, when a slightly stimulating action on the skin and nervous system is required. It may be continued for a long time without inducing the relaxation which is caused by frequent bathing in common warm water,

and is not unfrequently recommended as preparatory to bathing in the open sea, in which not only the stimulating effect of the saline substance is to be considered, but also the mechanical action and pressure of a large body of water, the motion of the waves, which, by their mass and the force with which they act, may be regarded as general douche, and are often not well supported by weakly persons and delicate children.

On entering the water at its natural temperature, a feeling of shivering, with slight oppression of the chest and convulsive respiration, termed the shock, is experienced, which, however, is but momentary, and passes off on immersing the whole of the body and moving about freely. After the bath, a greater or less degree of reaction ensues, indicated by a genial glow, increased redness of the surface, and a feeling of general vigour, with, in some cases, eruption on the skin. The object of sea-bathing is to induce this reaction, whence its tonic properties; the direct action of cold having a sedative and benumbing influence, depressing the powers of life, and, when prolonged, causing the blood to retire from the surface, and congesting internal organs, thereby inducing coma

and subsequently death. Thus, it will be obvious, that the period of the cold bath should not be too much prolonged; and also, that a certain degree of vigour and power of reaction is requisite in those to whom the cold sea-bath is recommended. It is consequently not advisable for very weak or delicate subjects, old people, or those disposed to internal congestions or hæmorrhage.

Cold sea-bathing acts, therefore, powerfully on the nervous system, invigorating body and mind, and increases the activity of particular organs, especially the skin, the respiratory apparatus, the lymphatic glands and absorbents, the liver and abdominal circulation. It may be recommended in states of general languor, lassitude, and debility, either from excesses, dissipation, or tedious convalescence; where there exists a preternaturally delicate state of the skin, with susceptibility to take cold, or a relaxed state of the mucous membranes; in constitutional, general, or local debility, as of the sexual organs, and scrofula, provided there be no feverishness or other counter-indicating circumstances, and in various nervous and other affections, where a tonic medication is indicated.

Independently, however, of bathing, a resi-

dence at the sea-side is beneficial in several states of disordered health ; as dyspepsia, bronchial affections, a disposition to consumption or scrofula ; increased nervous susceptibility, as in hysterical and other nervous affections, (which are less prevalent on the coast than in the interior,) the sea-air being not only comparatively free from fogs and vapour, but also strongly impregnated with saline particles, which tend materially to impart tone to the system, as is evident from the strong constitutions and good appetite generally enjoyed by sailors and residents on the coast.

Brighton is likewise a good deal resorted to by invalids, for the use of the artificial mineral waters at the German Spa, of which I have presently to treat.

ON BATHING.

THE practice of bathing, and ablutions with water, to which reference is frequently made, both in the Scriptures and by the ancient writers of various countries, may be said to date from the earliest periods of the world; having been followed not only as a hygienic and remedial means, but also, in a religious point of view, as typical of moral purity, and, as such, is continued to this day in eastern countries. The ancient Gauls had their sacred fountains, and in Great Britain certain springs were celebrated for their curative power from a very early period of history. The importance attached by the Greeks and Romans to baths is sufficiently attested by the remains of the magnificent structures which excite the admiration of the beholder, and by the beautiful specimens of fresco-painting and sculpture discovered in them. It

s computed that in the baths of Caracalla as many as three thousand people could bathe at the same time, in water at various degrees of temperature suited to their inclinations. The warm and hot baths were, however, almost exclusively in use under the emperors. A modern writer gives the following account of the use and abuse of baths among the Romans.

“During the republic the baths were cold. Mæcenas was the first to erect warm and hot ones for public use: they were called *Thermæ*, and were placed under the direction of *Ediles*, who regulated the temperature, enforced cleanliness in the establishment, and order and decorum among the visitors. Agrippa, during the time he was *edile*, increased the number of *thermæ* to an hundred and seventy; and in the course of two centuries there were no less than eight hundred in imperial Rome. The inhabitants resorted to the baths at particular hours, indicated by striking a bell or gong. Adrian forbade their being opened before eight in the morning, unless in case of sickness; whereas Alexander Severus not only permitted them to be open during the whole day, but also to be used through the night in the great heats of summer. It was a common practice with the Romans to bathe towards evening, and particu-

larly before supper : some of the more luxurious made use of the bath even after this meal. We are told of many citizens of distinction who were in the habit of bathing four, five, and even eight times a day. Bathing constituted part of the public rejoicing, equally with the other spectacles, and, like them, was prohibited when the country suffered under any calamity. All classes resorted to the baths; the emperors themselves, such as Titus, Adrian, and Alexander Severus, were occasionally seen among the bathers. The price of admission was very small, amounting to not more than half a cent.

“The Romans were fond of plunging into the baptisterium, or cold bath, after having come out of the vapour or hot one; at other times would be content to have cold water poured over their heads while in the hot bath.”*

There is no doubt that the substitution of hot for cold bathing, and the great abuse made of it, was a principal cause of the physical and moral difference between the Romans of the republic and the empire; and that it contributed, by its demoralising and enervating influence, to the production of various complaints unknown in the earlier periods of Roman history.

* On Baths of Mineral Waters, by John Bell. Philadelphia, 1831.

Wherever Rome extended her conquests, baths were established, of which numerous traces are to be seen at the present day, especially at several of the natural warm springs of Great Britain, France, and Germany.

In some northern countries, the use of hot baths, and especially of hot air and vapour baths, is excessively common among all classes. The comparative neglect of baths in Poland is no doubt a principal reason of the greater prevalence of cutaneous complaints among the inhabitants.

The following account of a Russian vapour bath is from the author I have already quoted. "A Russian bath is for the most part constructed of wood. It consists of one great hall, in which there is a stove against the wall, containing, besides fuel, large stones in a state of incandescence. Opposite to this, at regular degrees of elevation, are two or three rows of benches, on which the bathers sit or recline: some apertures at the top admit a faint glimmer of light, and give vent to the vapour in which the bather is involved, and which is supplied by pouring water over the heated stoves. The heat of the vapour to which the bather is exposed is from 122° to 132° Fahrenheit. After the expira-

tion of a quarter of an hour, or even double that time, when the body is in a profuse sweat, it is washed with soap and water, and gently switched with small birch-brooms; affusions of tepid, and finally of cold water, are practised by pouring buckets full of it on the head. Sometimes, when there are no conveniences for a supply of cold water, a Russian will rush out from the bath and plunge into the nearest stream, or even roll in the snow. After the bath, the man of rank takes a drink composed of a mixture of English beer, French or German white wine, and sugar, to which are added toasted bread and a few slices of lemon. The peasant or the slave will content himself with a drink of spirits or warm beer, into which at times mint is infused."

"Acerbi states that almost all the Finnish peasants have a small house built on purpose for a bath: the apartment is usually dark, with only a hole at the top. They remain for half an hour or an hour in the same room, heated to 167° F. The Finlanders will sometimes come out, still naked, and converse together, or with any one near them in the open air. If travellers happen to pass by while the peasants of a hamlet or little village are in the bath, and their assistance is needed, they will leave the bath, and assist in

yoking and unyoking, and fetching provender for the horses, or in anything else, without any sort of covering whatever, while the passengers sit shivering with cold, though wrapped up in good wolf's skin. The Finnish peasants pass thus instantaneously from an atmosphere of 167° F. to one in which the thermometer is as low as 24° below zero, which is the same thing as going out of boiling into freezing water; and, what is more astonishing, without the least inconvenience; while other people are very sensibly affected by a variation of but five degrees, and in danger of being affected by rheumatism by the most trifling wind that blows.”*

The Turkish, Egyptian, and East Indian baths, with the shampooing and other processes appertaining to them, and the delightful sensations experienced after leaving them, have been too often described by travellers to require that I should do more than allude to them; but it may be interesting to give a short notice of the vapour bath of the North American Indian; for which I must be indebted to the same work from whose pages I have so largely quoted.

“The Indians of North America have also their fashion of bathing, which is not very dissimilar from that of the Russians. They con-

* Bell on Baths, &c.

struct a kind of stove by fixing several small poles in the ground, the top of which they twist together so as to form a rotunda, and then cover it with skins and blankets so accurately, that the external air is completely excluded. The space left for the introduction of the body of the invalid, or person about to take the bath, is closed as soon as he gets in. In the middle of this small apartment they place red-hot stones, on which water is poured until a steam arises that produces a high degree of heat : the effect on the person enclosed is a speedy and profuse perspiration, which may be prolonged at will. Immediately after coming out, he hastens to the nearest stream, into which he plunges, and bathes for about half a minute ; he then puts on his clothes, sits down, and smokes with great composure ; and, what is of no little importance, with a thorough persuasion that the process will prove efficacious. The sudatory is often resorted to for the purpose of refreshment, or to prepare for the transaction of any business which requires unusual deliberation and sagacity."

The essential part of the treatment by the new method so much in vogue at present in Germany—the cold water cure—is on the same

principle. I purpose giving a short notice of this method in an appendix to the second part of my work on the baths of Germany.

Many persons who are accustomed to look upon the passage of the body from a state of perspiration to a temperature of extreme cold, as a measure fraught with danger, will suppose that this could only be done with impunity among half-savage people, or those who have been habituated to it from their infancy; but that this practice may be adopted pretty universally, not only without risk (provided there be no counter-indicating circumstances, as the existence of visceral disease, &c.) but even with benefit in certain cases, among all classes of the community, is proved by the little inconvenience experienced from it, in those cold-water establishments in Germany which are under the superintendence of a physician. In all these cases, however, it must be borne in mind that the perspiration is merely of a passive nature, and consequently differs materially from a similar condition induced by active exercise; when not only the surface, but also the muscular system and the interior organs of the body are in a state of excitement, and the circulation of the blood is accelerated. The taking a cold bath

in such a state would be highly dangerous, and not unlikely to cost the individual his life; whereas the action of the cold upon the skin, while in a state of passive perspiration, tends to invigorate it, and the body generally, and to lessen the susceptibility to atmospheric transitions. It is well known that the higher the temperature of the surface of the body, the greater is the power of resisting cold; it consequently follows, that a person whose skin is hot and perspiring might take a cold water bath, or roll in the snow, which he would not be able to do without risking an attack of illness when the surface of the body was cool, or its vital powers depressed. It is of course understood that in these instances the action of the cold upon the heated skin is of very limited duration; as, were it be too long continued, and the surface to become chilled, the usual depressing and benumbing effects of the abstraction of caloric from the body would not fail to become shortly manifested.

We see then from the preceding extracts the universal employment of baths in ancient times, and by some uncivilised nations; but in Great Britain, bathing, especially the use of the tepid bath, has been perhaps more neglected by all

classes of the inhabitants than by those of any other civilised country. Many persons, both in the metropolis and in the country, though scrupulously particular in the ablution of visible parts of the body, as the face, neck, and hands, seldom or never think of taking a general bath; and notwithstanding the greater density of its atmosphere, and the number of its inhabitants, which should render the use of the bath more imperative, London possesses but few facilities for bathing, in comparison with many of the continental cities, where the baths are numerous, well arranged, and at a price which puts them within the reach of all. It appears, however, that a greater degree of public attention is now directed to this important circumstance, the number of baths having increased in London within the last two or three years. In fact, when we consider the extent of surface occupied by the skin, its varied uses both as the chief organ of sensation, in which the ultimate ramifications of the blood-vessels and nerves terminate; and also as that in which the important functions of absorption, the secretion and excretion of perspiration and of the sebaceous matter by which its surface is lubricated, are carried on; its analogous office to the lungs

in promoting the decarbonization of the blood, and its extensive sympathies with other parts, especially the mucous membranes of the air-passages, of the alimentary canal, and the kidneys; we cannot fail duly to estimate the importance of bathing as the means best adapted both for maintaining this organ in a healthy condition, and also of rectifying many disordered states of the economy; and yet how seldom is it that baths are recommended in chronic disease ! Can it excite surprise that in individuals who pass months together without taking a bath, or perhaps even without washing the surface of their bodies, (as is the case especially with the poorer classes of the community,) the functions of the skin should become materially impaired, its circulation torpid, its secretions obstructed and vitiated, frequently giving rise by their re-absorption to deranged states of the health, the cause of which is seldom discovered, and which are vainly sought to be remedied by the internal administration of medicines. Among the numerous patients who daily apply for relief at the various hospitals and dispensaries, and whose skin is generally dirty and in a disordered state, how rarely is it that a bath or ablution is ordered ! It is true, that the recommending baths

to these patients, as part of the treatment of their diseases, would be of little use so long as the medical institutions in England are so indifferently supplied with them as at present; but even in private practice, where there would be no obstacle to the more free use of baths, how rarely do they form a part of the treatment, unless there be any existing disease of the skin ! I am convinced that in many instances the digestive powers become deranged, and the general health undermined, from neglecting to pay proper attention to the state of the skin ; that a large proportion of the catarrhal, rheumatic, and nervous affections, so prevalent in the variable climate of Great Britain, might be traced to the same cause ; and that the tendency to these complaints, as well as to pulmonary consumption, would be materially lessened, were persons in health accustomed to regulate the functions of the skin by the employment of bathing and ablutions, more frequently than is generally the case. Many persons, it is true, who perhaps never take a bath, yet enjoy good health, as the influence of habit will often enable the body to support many things that are generally prejudicial ; but, on the other hand, there is no doubt that many suffer from various un-

pleasant sensations, and disordered states of health, which might be prevented by the more frequent adoption of the practice.

Baths may be divided according to their temperature into

Cold.....	below 65° F.
Cool.....	from 65 to 77
Tepid.....	77 to 90
Warm.....	90 to 98
Hot.....	above 98

The cold bath is generally used in warm weather, as a means of cleansing the surface, cooling the body, and of imparting tone and vigour to the system. It is in general well suited to healthy adults, and to those whose system is relaxed, without the existence of any disease. The duration of the bath must depend upon the circumstances and individual constitutions. Some persons may remain half an hour or longer in the water with impunity, provided they continue in motion. For others, a few minutes would be too long, and two or three plunges would be sufficient to induce a healthy reaction. It is not in general adapted to delicate females, to old people, or to young children; and though it has been by many con-

sidered as tending to strengthen children and weakly persons, it is more likely to have a prejudicial effect, and several would fall a sacrifice before getting accustomed to it. In certain cases cold water is used for producing the shock or impression on the nervous system, as is daily seen in sprinkling the face of fainting persons, of hysterical women. The surprise bath was used some years ago in mania, chorea, &c., upon the same principle, but is now generally abandoned.

Tepid and warm baths act as a sedative upon the nervous system, allaying irritation, promoting a freer action of the exhalant functions of the skin, and determining from internal organs, and thus preserving a due equilibrium of the circulation, and between the surface and internal parts. They are available at all times of the year, and are much more generally employed as a remedial means, than the cold bath, though their employment, both in acute and chronic disease, is much more restricted in England than in several continental states. They are, however, frequently used by British practitioners, in the practice of surgery, as a means of producing muscular relaxation as for the reduction of herniæ, and in spasmodic retention

of urine ; as also to allay the irritation induced by some diseases, as stone, and after operations.

However useful and recommendable the occasional use of the warm bath may be, a prolonged course of daily bathing would not be advisable, as it would tend to enervate and produce relaxation of the system, and would increase the susceptibility to cold ; but this is not the case with mineral waters in general, in cases to which they are adapted, or water strongly impregnated with saline particles, as the sea. A tepid bath of common water will be of great service after much fatigue, travelling, in cases of sleeplessness, and general nervous irritability. It is also well suited to children whose skin is in a bad state, and in whom a tendency to convulsive affections exists, as also to several of the instances which I have enumerated in the preceding pages, under the heads of the slightly mineralised springs.

The hot bath, from its exciting property, is comparatively seldom employed in the practice of medicine. Some persons, however, who have an habitually cool skin and languid circulation, bear very well baths at a high temperature, and derive advantage from them. The hot bath is also sometimes advised as a revul-

sive measure, and in states of collapse, when the skin is cold and the powers of life are at a low ebb. Some of the continental mineral baths, as Mont D'Or, Teplitz, &c., are used at a very high temperature, with advantage, in long standing rheumatic, paralytic, and cutaneous complaints.

The vapour-bath is usually taken in England while the person is standing, or seated, in an apparatus too well known to need description. Its action differs from that of the stufæ, Russian or Indian baths, of which I have already spoken, by the lower temperature, and by the head being excluded from the vapour, which consequently acts merely upon the surface of the body, producing copious perspiration, whereas the former acts at the same time upon the whole pulmonary system, and is much more generally exciting. In its general effects vapour has a very analogous operation with water-baths, except that in the former the amount of sensible perspiration is much increased, and nothing is absorbed, whereas a person, after having been for a certain time in a water-bath, absorbs a greater quantity of fluid than he loses by perspiration, and would weigh heavier on coming out, than previous to the bath. Vapour-baths

can also be taken at a much higher temperature than water-baths, owing to their medium being less dense. They are generally preferred in cases where a greater degree of relaxation of the surface is required, as in persons of dry skin and rigid fibre; affected with long-standing rheumatic and cutaneous complaints, neuralgia, and various other diseases. The vapour of several hot mineral springs is employed as a general or local bath, and also for inhalation, but, though it may be slightly impregnated with gas, cannot have a very different operation from the vapour of common water.

The shower-bath, either cold or tepid, according to circumstances, is a valuable means of preserving the health, and of fortifying the system of nervous and delicate persons. It is likewise highly advantageous in remedying certain disordered states of health, in which an ordinary bath would not be applicable; as some cerebral affections, cases of nervous irritability with a tendency to spasmodic affections, sleeplessness, &c.

Local baths, as when the lower half or a part of the body is immersed in the water, are also of frequent use in the practice of medicine;—the former, or the hip-bath, is often of great service

in cases of undue determination of blood to the head and upper parts of the body, with coldness of the extremities, and also in allaying irritation of the pelvic viscera, and equalising the circulation between them and the surface. Foot-baths are also commonly used on the principle of revulsion, for the removal of colds, and slight inflammatory affections of the throat and air-passages. They, as well as hand-baths, are also very useful in febrile diseases, where the brain or the bronchial lining are congested, and when the palms of the hands and soles of the feet are hot and dry. Fomentations, which in fact, as well as poultices, are a local warm bath, may be used on such occasions.

Various fluids, as milk, broth, &c., are occasionally used as baths for their softening or nourishing qualities. Stimulating substances, as salt, mustard, and medicinal extracts or plants, are also sometimes employed for medicating baths. It is, however, foreign to my purpose to enter into the consideration of these agents.

ON

ARTIFICIAL MINERAL WATERS.

THE acknowledged power and efficacy of mineral waters in the treatment of chronic disease have at different periods occasioned attempts to imitate them, with a view to render this class of remedies of more universal application; but these imitations, owing to the imperfect knowledge of the chemical composition of the natural springs, and the want of proper apparatus, could scarcely be said to bear a resemblance to them in their properties and mode of action, till the period when Dr. Struve, by unremitting perseverance, and at considerable expense in the construction of the requisite apparatus, succeeded in bringing artificial mineral waters to a high state of perfection, so as in many instances scarcely to be distinguished from the natural ones; and the beneficial effects resulting from the use of these waters at Dresden, soon gave rise to

the formation of similar establishments in other cities of the continent, as Leipsic, Berlin, Petersburg, Moscow, Warsaw, Königsberg, &c., which are annually frequented by numerous patients.

In the preparation of these compounds a complicated apparatus is required; to maintain in the waters the requisite degree of saline and gaseous impregnation, the proper degree of temperature, &c., a small thermometer is inserted in each water, and a person is constantly on the watch, to see that the temperature does not vary from that of the natural spring. Distilled water only is used, and the best analyses are so closely followed, that even minute portions of inert substances, as silex, are not omitted, as Struve justly observes in his work. "In a mineral spring, no constituent part is indifferent, and the smallest has its share in the general action, although it may, in itself, apparently possess no power."* It is not unfrequently seen with respect to pharmaceutical preparations, that when the supposed inert parts have been abstracted, the remedy is less efficacious than before.

* Ueber die Nachbildung kunstlichen, und naturalischen Heilquellen.

Most unprejudiced persons acquainted with mineral waters admit, that, as far as sensible properties are concerned, there is no material difference to be detected between many natural springs and their prototypes. I have not had an opportunity of comparing the two kinds of waters together at the same time, but as far as my recollection of the taste, smell, &c. of some of the principal ones, as Carlsbad, Kissingen, &c., serves me, I should say that the difference in these respects is very slight. The majority of physicians at the various baths, however, who are naturally strongly opposed to artificial waters, assert that even though there may be no very perceptible difference in their physical properties, yet the natural springs are much more efficient in their action on the economy; which, however, in the present state of matters, it would not be easy to ascertain, as no accurate statistical information of the effects of the natural springs can be obtained, owing to the partial statements put forth in favour of the individual springs, while seldom is any report made of the unfavourable cases. Several German practitioners of eminence, as Doctors Von Ammon, Hedenus, Horn, Kreysig, Rust, &c., who have had frequent opportunities of testing the merits

both of natural and artificial waters, are of opinion that, looking to the water alone, with regard to its internal administration, the artificial are equally efficacious with the natural waters; whereas other practitioners whose names stand equally high with the preceding, as authorities on mineral waters, as Hufeland, Osann, Carus, Wetzlar, &c., consider the former to be inferior to the latter, though they allow that they have great analogy with them, may be regarded as an efficient substitute, and are well calculated to render great service in the treatment of chronic diseases.

Some of the artificial mineral waters are better adapted for being sent to a distance than the natural ones—especially such as contain a large proportion of carbonic acid and iron. Chalybeate waters exported far from the spring, or if kept long, become decomposed, and the iron is precipitated; but it remains longer in suspension in the artificial waters. Those of Spa and Marienbad, which I took for the purpose of examination from the establishment at Brighton, retained their taste, and a considerable proportion of their gas, for several hours, though left exposed to the air in uncorked bottles. It was not till about twenty hours after being taken

from the pump, that the iron of the former became precipitated, and, on agitating the bottle containing the latter, a considerable portion of carbonic acid was evolved. The Seltzer water appeared to me to resemble least the natural spring, from its being too much charged with carbonic acid; on allowing part of the gas to escape, its taste approximated somewhat nearer, but was still very different from the real water. Osann made the same remark with respect to the Seltzer water of the establishment at Berlin; and in fact, from being so strongly charged with gas, it approaches nearer to the Eau de Seltz of the Parisians—or the soda water of the shops, which, however pleasant as a beverage, and useful for the correction of acidity in wines, &c., cannot be looked upon in the same light as the natural water in a medicinal point of view.

Among the arguments which have been adduced in support of the opinion that the artificial waters cannot be regarded as analogous with natural ones, are, 1st, that new elements are frequently detected in mineral springs, of the existence of which no idea was entertained in former times, and that there is great probability that other constituent parts would be disco-

covered were the science of chemistry in a more advanced state. 2ndly. That the state of admixture of the various component parts is more intimate in natural springs. 3rdly. That the heat of thermal springs, being probably of volcanic origin, has a different action on the body than heat artificially produced. 4thly. That a peculiar substance of an animal nature, evident to the taste and smell, exists in several natural springs, which is not discoverable by chemical analysis, and which is absent in the imitations of those springs. 5th. That mineral springs, especially thermal ones, have a living property, and frequently produce effects on the animal economy which cannot be accounted for by their component parts, the quantity of which is often very minute. On the other hand, it is asserted that the mixture of the component parts of artificial waters is as intimate as in natural ones; that when no perceptible difference exists in the sensible and physical properties of both kinds, it may be inferred with reason, that the effects would be the same; that some natural waters vary considerably at different times, and are affected by various circumstances, as the state of the atmosphere, rainy or dry weather, &c., whereas artificial waters are the same under all

circumstances; that in some springs the composition has been different at different periods, and yet they are recommended in the same diseases.

Hertz remarks on this point, "The second edition of Heidler's book (on Marienbad) recommends the waters in the same class of complaints as the first edition, published in 1822; though it is well known the springs underwent considerable alteration in their composition between these periods: and also that the taste of many springs varies in different weathers. Westrumb found in a spring at Pyrmont twenty-nine grains of solid substance, whereas Gmelin found, the previous year, only eleven; and the Trinkquelle yielded in different months of the same year, at one time a hundred and twenty-two, at another only thirty-seven, and at another time a hundred and eleven grains of solid substance."*

Again, it is said that the living power of mineral waters and the peculiarity of their caloric are purely hypothetical, and have been disproved by experience; but even were these positions admitted, it is in the form of bath that their action has been considered to be princi-

* Die kuntslichen Mineral-wasser in ihren Verhältnisse zu den natur alichen. Berlin.

pally manifested. The same author I have quoted says, "Let any one point out to me a single spring without gas and mineral constituents, which, by its internal employment alone, has a more powerful action than that of common boiled or distilled water, and I am very ready to give up my view of the case." The effects of natural and artificial waters are also said to be similar, by persons who have employed both kinds; and the after effects or crises occurring subsequent to the employment of the natural, have been likewise also experienced from using the artificial, Carlsbad water.

The following case, in illustration of the identity of effects of the natural and artificial waters, is related by Dr. Schmaltz of Dresden, and is given in Vetter's *Brunnen und Bade-Buch*, whence I have extracted it.

"A patient, subject to rheumatic attacks, laboured also under obscurity of vision of the left eye, from opacity of the lens. The sight of the right eye likewise began to be affected,—there were present symptoms indicative of a congestive state of the abdominal venous system,—constipation, headache, pains in the loins, and piles. After he had drank for a week the

water of the Muhl and Neubrunnen, his physician was astonished to find that he had a decided attack of jaundice, the eyes being of a dark yellow colour, and was apprehensive of the existence of serious disease of the liver; but the patient, smiling, allayed his fears by informing him, that on account of this very circumstance, he had a greater degree of confidence in the artificial waters; as, on two former occasions, at an interval of several years between each, he had drank these two springs at their source in Carlsbad, and, on each occasion, on the fifth day of drinking he had been attacked with jaundice; the attacks having subsided after three weeks' use of the water, leaving his general health much improved. This also proved to be the case on the present occasion from the use of the artificial waters."

The softening of recently fractured bones, which has occurred from the use of the Carlsbad springs, has also taken place on two or three occasions during the employment of the artificial Carlsbad. One of these cases is related by Rust; the patient had some time before fractured his arm and forearm: in the third week of drinking the artificial Carlsbad water, the

bones became soft, and the arm pliable as wax, requiring the support of splints. A circumstance likewise occurred to Dr. Hille, the author of a work on mineral waters, who fractured his leg; the fracture had united badly, leaving a thick bony ring on the surface of the tibia, perceptible both to the sight and touch. Seven years afterwards he drank the artificial Muhlbrunnen, for rheumatic pains, and was surprised to find that not only the pains disappeared from the use of the water, but also that the bony prominence had so far diminished as no longer to be perceived by the eye.

Admitting, however, the identity of the composition and effects of natural and artificial waters in many instances, the use of the latter must be restricted to their internal administration, as baths would be both difficult to obtain, and expensive; whereas, in a large proportion of the cases in which the greatest benefit is obtained from mineral waters, bathing is the most essential part of the treatment. This is especially the case at most thermal springs, several of which, being but slightly mineralised, are exclusively used for baths; and even when the internal use of a mineral water is more especially

indicated, bathing may frequently be advantageously combined with the drinking. On this account, then, even were there no other reasons, the natural springs are infinitely to be preferred by those who have the choice. Rust, it is true, in alluding to the slightly-mineralised springs, states a case in which he considered baths of distilled water were as efficacious as those of Gastein would have been; but as the particulars of the case are not given, it proves nothing, even supposing that any impartial judgment could be formed upon one, or upon a few isolated cases. It is well known that the effects produced by these and some other slightly mineralised baths have not been hitherto satisfactorily accounted for, though their high temperature and elevated position are no doubt principally instrumental in the cures which they have effected; as the influence of climate, locality, &c., of a spring upon mind and body, have to be considered, as well as the physical and chemical properties of the water, in estimating the results of a course of mineral waters. "An artificial mineral water," says Löwig, "drank on the Alps, would have a different operation from that which it would have, if taken in Berlin; and were the

springs of Pfeffers to rise in the grove of Luneburg, they would certainly not have the same reputation which they now enjoy." *

Natural mineral springs have also an advantage over artificial waters, in most instances, in being favoured by auxiliary circumstances calculated to promote the restoration of health. Thus, the journey to the springs; the change of air and scene; the beauty of the scenery, and interesting environs of most of them; the temporary freedom from cares and annoying avocations; the early rising and exercise in the open air, are circumstances of great importance in assisting the action of the waters, and in several of the slighter ailments would probably alone suffice to rectify the deranged condition of the system; but it must be borne in mind, on the other hand, that in several of the worst cases, in those who resort to mineral springs for relief, these circumstances can have no influence, and the beneficial effects are solely to be attributed to the action of the waters. Many persons who care little about the beauties of scenery, and take no interest in public amusements, soon become tired, and experience discomfort at being separated from their homes

* Schwartze Heilquellenlehre. Leipsic, 1839.

and friends, and are only induced to subject themselves to the inconveniences of a long journey to a mineral spring, by the expectation of the benefit which they know from experience they are likely to derive from it. How many persons have I known crippled, and almost confined to their room, suffering from pain, without society or resources for amusement—whose spirits have become greatly depressed, on account of their condition, and the inconvenience of a residence in a crowded hotel or bath-house, and yet, a short time after using the baths, have experienced a sensible amelioration, and have ultimately recovered; though they had previously tried other means of relief without success? These are the cases by which the power of mineral springs are to be satisfactorily tested, and in which the mere drinking an artificial mineral water would produce little or no effect. Many persons, again, engaged in business, soon experience at a bath the influence of ennui; are disinclined to form new acquaintances, and are anxious respecting the course of their affairs, and yet are induced to prolong their stay from the evident improvement in their health during the course; though perhaps little or no alteration is made in their ordinary period of rising,

or in their diet. Such persons, where a course of bathing is not required, will often derive as much benefit from drinking an artificial water, which may also be recommended as an efficient substitute, when a person cannot undertake a long journey, or if he be an inhabitant of a town where there is an establishment of mineral waters, and is disinclined to absent himself from his family and usual avocations.

When drinking is the more essential part of the treatment, artificial waters have, in some respects, the advantage over natural ones, such as being available during the greater part of the year, instead of their employment being restricted to a few months in the summer, as is the case at the various baths : they may also in some cases be used as a preparatory measure, or subsequent to the use of the natural springs. Several of the most powerful waters are collected together in one establishment, and if one which appeared to be indicated did not suit, recourse might be had to another ; at all events, the disappointment would not be so great as where a person had been induced to make a journey of several hundred miles to a spring, and found it unsuited to his case ; a circumstance of not un-

frequent occurrence, and often depending upon the adoption of the advice of those who are but little acquainted with the properties and effects of the different springs, or who are prejudiced in favour of particular ones; though it must be admitted that patients occasionally suffer disappointment from the difficulty which even experienced practitioners have in forming an opinion, in obscure chronic cases, as to the means most likely to be of service; from the intractableness or incurability of the complaints; from the idiosyncrasy of individuals, &c., in consequence of which the effects of a mineral spring cannot always be estimated before trial has been made; as is likewise seen to be the case with many remedies in the ordinary practice of medicine, when medicines apparently indicated disagree, or do not produce the effects anticipated.

Some persons are accustomed, in order to increase the activity of natural and artificial waters, to add salts or other substances to them. I have already attempted to show, in a former part of this work, that such additions are with a few exceptions prejudicial, and calculated to prevent the proper mode of action of these remedies. The same remark will apply to the

combining together two kinds of mineral water. If any one will refer to the analysis of an efficient mineral spring, as Carlsbad, he will find a quite sufficient number of medicinal substances, for all practical purposes, without the necessity of adding as many more by the admixture of a different kind of water; though it is true that by this means the activity of the compound upon particular organs may be increased. This, however, is not what is usually required in a course of mineral waters, and the practice of administering the artificial ones in such a manner as to produce sensible effects at the time, has occasioned some of their advocates to say that they are even more active than the natural springs; but if merely active effects upon particular organs be required, a mixture from a druggist's would answer the purpose just as well; and as Osann has justly remarked, in reply to such an advocate the superior activity of artificial waters, "Though it may prove the power of the artificial waters, it speaks directly against the identity of their action with natural ones."

Some of the natural springs are better adapted for imitation than others. The waters of Pullna and Salschutz, which can scarcely be

* Darstellung der bekannten Heilquellen, &c. Berlin, 1840.

regarded as springs, but which percolating through the soil of a particular district, and becoming strongly impregnated with the salts with which it abounds, are collected in pits dug for the purpose, and which are actively purgative, are perhaps in no wise superior in point of medical efficacy to the artificial ones. The artificial Carlsbad water is also one of those most frequently used, and is very analogous in its operation to the natural springs. The Marienbad and Kissingen imitations also produce similar results in many instances, though, at the springs themselves, bathing frequently forms part of the treatment, and is of material assistance to the internal use of the water. On the other hand, sulphurous or saline springs, as Aix la Chapelle or Wisbaden, are not well calculated for imitation, as bathing forms the more essential part of the treatment in most of the cases which these springs are calculated to relieve; the same may be said of Kreutznach, though at Brighton the sea-water would not form a bad substitute for these baths, combined with the internal use of the artificial Kreutznach water.

The following are the waters manufactured in the establishment at Berlin; the number of patients averages about 600 annually.

Four of Carlsbad ; viz. Sprudel, Muhlbrunnen, Neubrunnen, and Theresienbrunnenn. Two of Ems, the Kranchen and Kesselbrunnen. The Grande-Grille of Vichy ; the Kreutzbrunnen and Ferdinandsbrunnen of Marienbad ; the Hauptquelle of Pyrmont ; the Pouhon of Spa ; the Franzquelle and Salzquelle of Franzensbad ; the Obersalzbrunnen ; the Ragozzi of Kissingen ; the Adelheidsquelle of Heilbronn ; the Elizabethquelle of Kreutznach ; Narzana of the Caucasus ; the waters of Pullna Saidschutz and Selters. The Brighton establishment possesses, in addition to the above named, the Saratoga water.

For information respecting the properties of most of these springs and their analyses, I beg to refer to my works on the “Baths of Germany ;” and the “Account of the Watering Places and mineral Springs of the Continent.”

There exists likewise an establishment for the manufacture of some of the most celebrated mineral waters of France, Germany, and Italy, at Oleggio, situate a short distance from the Simplon Road, among the magnificent scenery of the Lago Maggiore, which is much resorted to in the summer months by invalids from Savoy, the north of Italy, and the adjacent

countries. The patients lodge in the establishment, which is conducted by Dr. Paganini, and comprises various resources for recreation—as a botanical garden, casino, library, small theatre, restaurateur, &c. Baths and douches form part of the treatment in particular cases. The waters are extensively exported throughout Savoy and Piemont.



ERRATUM.

Page 85, line 6, *for* as general douche, *read* as a general douche.

LONDON:

IBOTSON AND PALMER, SAVOY STREET, STRAND.

ARTESIAN WELL.

THE undertaking of boring for an Artesian Well on the left bank of the Seine, proposed by M. Mulot, a locksmith of Epinay in 1832, has just been crowned with success, after more than seven years continued labours, which were several times on the point of being abandoned, but for the representations of M. Arago, of the almost positive certainty of ultimate success. A great part of Paris will consequently have the advantage of being supplied with natural warm water, much purer than that of the Seine, and applicable to various domestic uses. The well is near 1,800 feet deep, being six times as deep as the Hôtel des Invalides is high. The water is thrown to the surface in repeated jets, and flows off by a drain at the rate of six millions of quarts in the twenty-four hours. Its temperature is 28° (centigrade), and it has neither taste nor smell. Thus the theory of the central heat of the globe, as the source of the ele-

ARTESIAN WELL.

vated temperature of thermal mineral springs, receives from this an additional confirmation, as also the existence of immense subterraneous reservoirs of water, which making its way to the surface at various points, affords the continued supply which has existed for centuries; though the mode of the impregnation of mineral springs with saline and gaseous substances, always in about the same proportions and combinations in each spring, still remains as much as ever enveloped in mystery.

Paris, March 1840.



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